Annual Report of the Ministry of Forests

for the fiscal year ended March 31, 1990

Province of British Columbia

Ministry of Forests

Honourable Claude Richmond, Minister

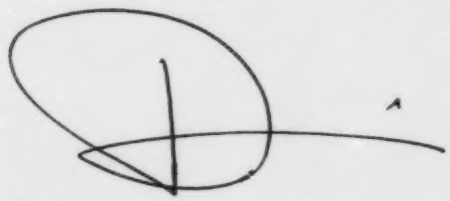
91-06080/

April 16, 1991

The Honourable Claude Richmond
Minister of Forests
Parliament Buildings
Victoria, British Columbia

Sir:

I have the honour to submit the Annual Report of the Ministry of Forests for the fiscal year ended March 31, 1990.



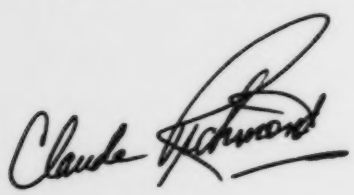
R. S. Plecas
Deputy Minister
Ministry of Forests

April 17, 1991

Lieutenant-Governor of British Columbia in Council
Parliament Buildings
Victoria, British Columbia

May It Please Your Honour:

Herewith I respectfully submit the Annual Report of the Ministry of Forests for the fiscal year ended March 31, 1990.



Claude Richmond
Minister of Forests

Contents

I. The Ministry of Forests

Prologue 3
Mission 3
Legislative authority 3
Corporate commitment 3
Corporate values 4
Ministry goals 4
The ministry's structure 5
Headquarters organization 6
- Executive
- Industry Development and Marketing Branch
- Public Affairs Branch
- Valuation Branch
- Policy and Planning Branch

Forestry division 7
- Integrated Resources Branch
- Inventory Branch
- Research Branch
- Silviculture Branch
- Protection Branch

Operations division 8
- Region organization 9
- District organization 10
- Timber Harvesting Branch

Management Services division 11
- Financial Services Branch
- Information Systems Branch
- Human Resources Branch
- Technical and Administrative Services Branch
- Audit Services Branch

II Program reports

Introduction 15
Management Services 16
- Public Information and Library Services 18
- Policy and Planning 20

Harvesting 21
- Industry Development and Marketing 23

Silviculture 25
Research 28
Protection 32
Integrated Resource Management 35
Inventory 39
Fire Suppression 41
Forest Resource Development Agreement 43

Forest Stand Management Fund 47
Small Business Forest Enterprise Program 49
South Moresby Forest Replacement Account 52
Silviculture — private sector 54
Silviculture activity summary 56

III. Summary financial and statistical tables

Table 1: Revenue in 1989-90, by category and region 67
Table 2: Expenditure and full-time equivalents in 1989-90, by source of funds 68
Table 3: Expenditures in 1989-90, by category and region 69
Table 4: Productive forest land in 1989-90 in timber supply areas and tree farm licences, by region 69
Table 5: Deletion of land from provincial forests in 1989-90, by region 70

IV. Detailed financial tables

A-1 Minister's Office 73
B-1 Management Services 73
C-1 Harvesting 74
D-1 Silviculture 74
E-1 Research 75
F-1 Protection 75
G-1 Integrated Resource Management 76
H-1 Inventory 76
I-1 Direct Fire Fighting 77
J-1 Fire Suppression Preparedness 77
K-1 Forest Resource Development Agreement 78
L-1 Forest Stand Management Fund 78
M-1 Small Business Forest Enterprise Program 79
N-1 South Moresby Implementation 79
P-1 Silviculture activity summary 80

V. Detailed statistical tables

C-2 to C-11 Harvesting 83
D-2 Silviculture 94
F-2 to F-6 Protection 95
G-2 to G-6 Integrated Resource Management 98
K-2 Forest Resource Development Agreement 101
L-2 Forest Stand Management Fund 102
M-2 to M-5 Small Business Forest Enterprise Program 103
N-2 South Moresby Implementation 105
O-2 to O-3 Silviculture — private sector 106
P-2 to P-12 Silviculture activity summary 111

I. The Ministry of Forests

Prologue

Mission

The Ministry of Forests manages and protects the forest and range resources of the province for the optimum balance of economic, social and environmental benefits to British Columbians, now and in the future.

The ministry is mandated with resource stewardship for provincial forests, which cover 85 per cent of the province.

These forests, which have a greater diversity of forest types than the forests of any other jurisdiction, are managed for range, recreation, wildlife, fisheries, water, aesthetic and other social values.

Only about one quarter of the province is managed as commercial forest for a balanced mix of these values, along with the growing and harvesting of timber.

Each year, timber is harvested from about one per cent of the commercial forest. This harvest sustains the $13-billion forest sector, which is the main driver of the province's economy and represents about $10,000 for every British Columbia household.

Rapidly changing social values require on-going revision of the ministry's management plans to meet the public's many and often conflicting demands.

The ministry's challenge, as steward of the province's forests, is to continue to ensure the best possible balance of economic, social and environmental benefits to all British Columbians.

Legislative authority

The *Ministry of Forests Act* (Section 4) states the mandate. It is to:

"a. encourage maximum productivity of the forest and range resources in the Province;
b. manage, protect and conserve the forest and range resources of the Crown, having regard to the immediate and long-term economic and social benefits they may confer on the Province;
c. plan the use of the forest and range resources of the Crown, so that the production of timber and forage, the harvesting of timber, the grazing of livestock and the realization of fisheries, wildlife, water, outdoor recreation and other natural resource values are co-ordinated and integrated, in consultation and co-operation with other ministries and agencies of the Crown and with the private sector;
d. encourage a vigorous, efficient and world-competitive timber processing industry in the Province; and,
e. assert the financial interest of the Crown in its forest and range resources in a systematic and equitable manner."

Responsibilities and authorities are defined in:

- *Ministry of Forests Act*, Revised Statutes, 1979, Chapter 272;
- *Forest Act*, Revised Statutes, 1979, Chapter 140;
- *Range Act*, Revised Statutes, 1979, Chapter 355; and,
- *Forest Stand Management Fund Act*, 1986, Chapter 8.

The ministry has administrative responsibility for the *Foresters Act*, Revised Statutes, 1979, Chapter 141. An additional statute that affects the ministry is the *Boom Chain Act*, Revised Statutes, 1979, Chapter 33.

Corporate commitment

To implement its mandate, the ministry has made a corporate commitment to:

- grow healthy, productive forests to meet the province's social and economic needs;
- provide forest recreation and manage wilderness values in provincial forests;
- manage and protect Crown forest lands to ensure sustainable development of:
  - timber for the forest industry; and,
  - forage for the livestock industry;
- ensure the province receives appropriate resource revenues from Crown forests and range;

- encourage a vital, efficient, and world-competitive wood-processing industry; and,
- ensure the optimum balance of all these resource values through integrated resource management.

Integrated resource management is a process which:

- identifies and considers all resource values;
- considers social, economic and environmental needs and objectives;
- assigns resource use and management emphasis based on:
  - analyses of the relative merits of various resource uses and objectives; and,
  - the capabilities of the land;
- Is guided by the principles of sustainable use and resource stewardship; and,
- Produces a picture of resource uses for the present and schedules resource-use changes over time.

To achieve integrated resource management, the ministry will:

- fairly and equitably consider social, economic and environmental factors;
- adopt a client oriented focus on solving the problems of client groups; and,
- provide participation and consultation opportunities.

Corporate values

- To maintain a commitment to get results, through effective programs and financial responsibility, and to maximize job opportunities;
- To encourage public and private sector participation in determining and achieving ministry objectives;
- To respond to client needs through efficient, timely and courteous service and decentralized responsibility and accountability; and,
- To develop innovative and entrepreneurial management, through staff development, with an emphasis on excellence.

Ministry goals

- To grow healthy, productive forests;
- To make timber available to the forest industry;
- To generate revenues for the Crown from timber harvesting;
- To manage provincial forests for recreational and various other uses;
- To manage forage production for domestic livestock and wildlife;
- To make forage available to the livestock industry;
- To ensure reforestation of Crown forest lands;
- To conduct research in forest renewal, forest productivity and decision aids, and integrated resource management;
- To protect the province's forest and range resources from damage by fire, forest insects and diseases;
- To maintain a current and accurate inventory of forest and range values; and,
- To inform various audiences about the ministry's mandates, goals, organization, policies, programs, products, services and achievements.

Reports

The *Ministry of Forests Act* requires these reports to be prepared:

- a periodic analysis of the conditions, management, and future uses of the forest and range resources to help set overall priorities and long-term objectives;
- a five-year program updated annually, which sets schedules, methods and priorities for forest and range resource management and improvement; and,
- an annual report on the ministry's programs and activities, including money spent and information on whether the resources entrusted were well managed and value was received for money spent.

The Ministry's Structure

The ministry is structured to:

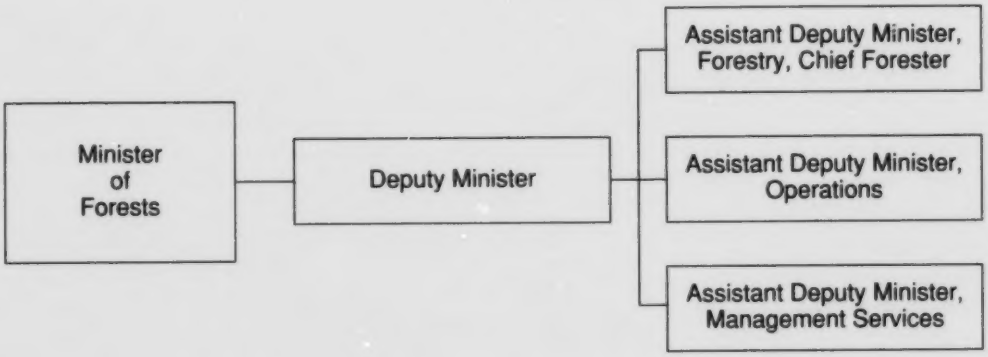
- Manage the resources more effectively;
- Decentralize decision-making to ensure efficient and highly responsive service to ministry clients;
- Emphasize integrated resource management and forest product development and marketing;
- Establish clear line/staff relationships;
- Ensure accountability of managers;
- Achieve excellence through a commitment to employees; and,
- Emphasize contracting of services and an audit approach to management.

Headquarters organization

The headquarters staff has three divisions:

- Forestry;
- Operations; and,
- Management Services.

As shown in the organizational chart below, each division is headed by an assistant deputy minister. These three officials, together with the deputy minister as chairman, constitute the ministry's executive.



Four branches of the ministry, headed by directors, report directly to the deputy minister. They are:

- Industry Development and Marketing;
- Public Affairs;
- Valuation; and,
- Policy and Planning.

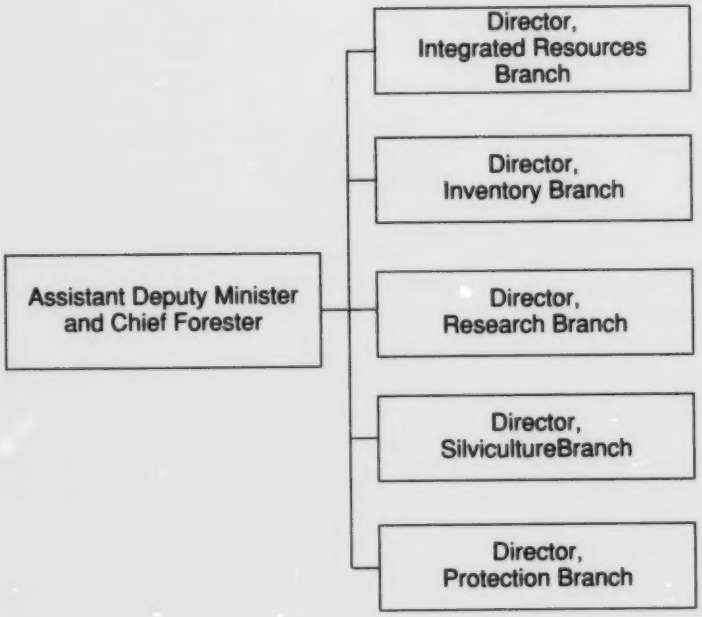
Forestry division

The Forestry Division ensures all Crown forest lands are managed to provide the greatest long-term benefits for British Columbians.

The assistant deputy minister of this division is also chief forester.

The Forestry Division is composed of the following branches:

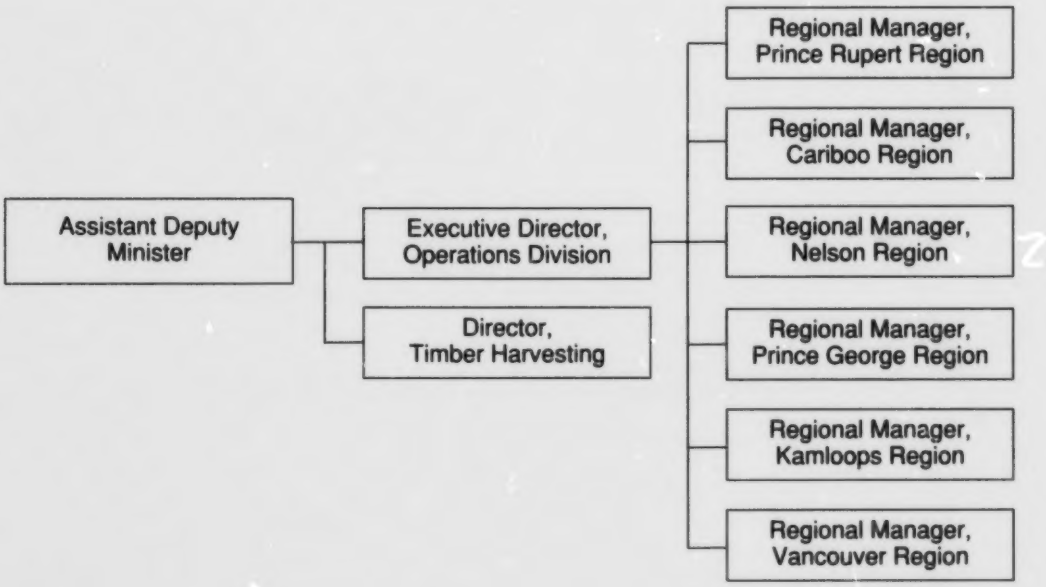
- Integrated Resources;
- Inventory;
- Research;
- Silviculture; and,
- Protection.



Each branch is headed by a director. The director of the Integrated Resources Branch is also the assistant chief forester.

Operations division

The Operations Division oversees the ministry's regional and district offices. The Timber Harvesting Branch with two sections — Timber Allocation and Engineering — is also in this division.



Region organization

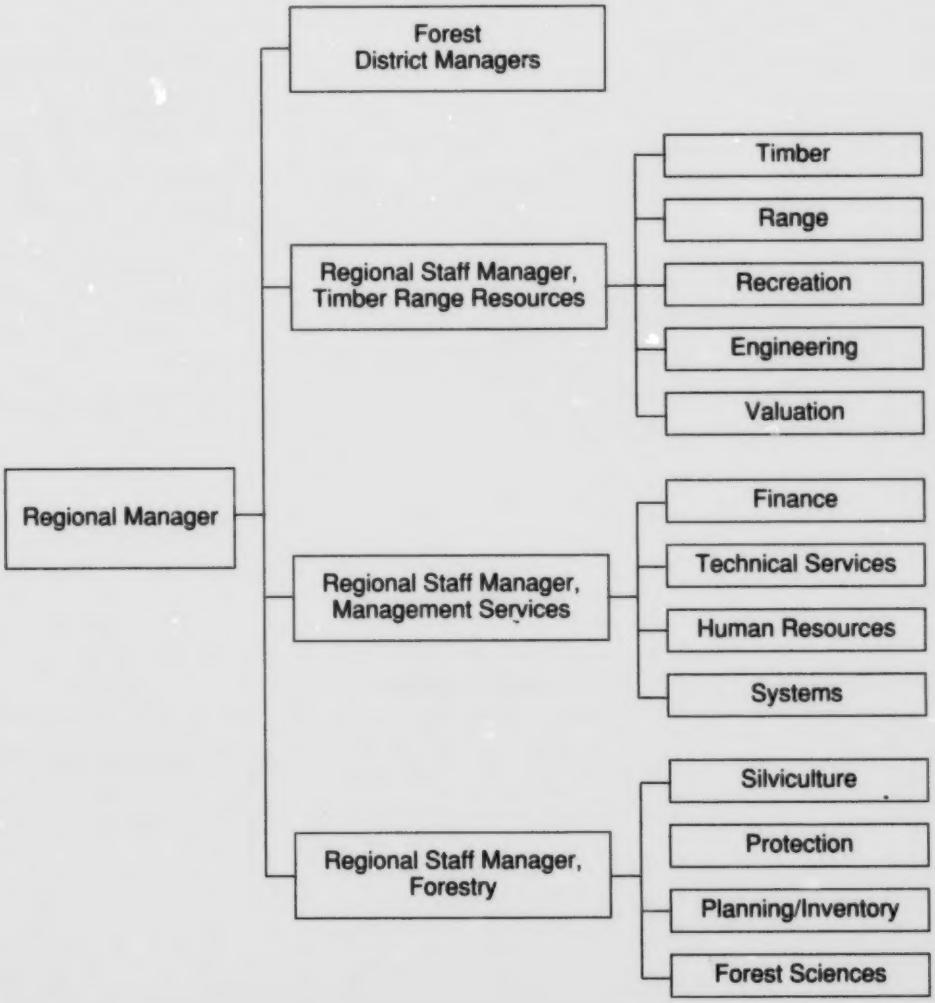
The province is divided into six forest regions for administrative purposes, with each forest region subdivided into forest districts. Each region has a regional manager.

The organization of a forest regional office is shown below.

Three regional staff managers — for forestry, management services, and timber range resources — provide advice and services to each regional manager and to the various district managers who report to the regional manager.

Regional office personnel are responsible for servicing, coordinating and monitoring the activities of all field personnel operating out of district offices.

The staff of each regional office develops regional programs and plans, and ensures all policies, programs and procedures originating from ministry headquarters are administered consistently and effectively throughout the region.

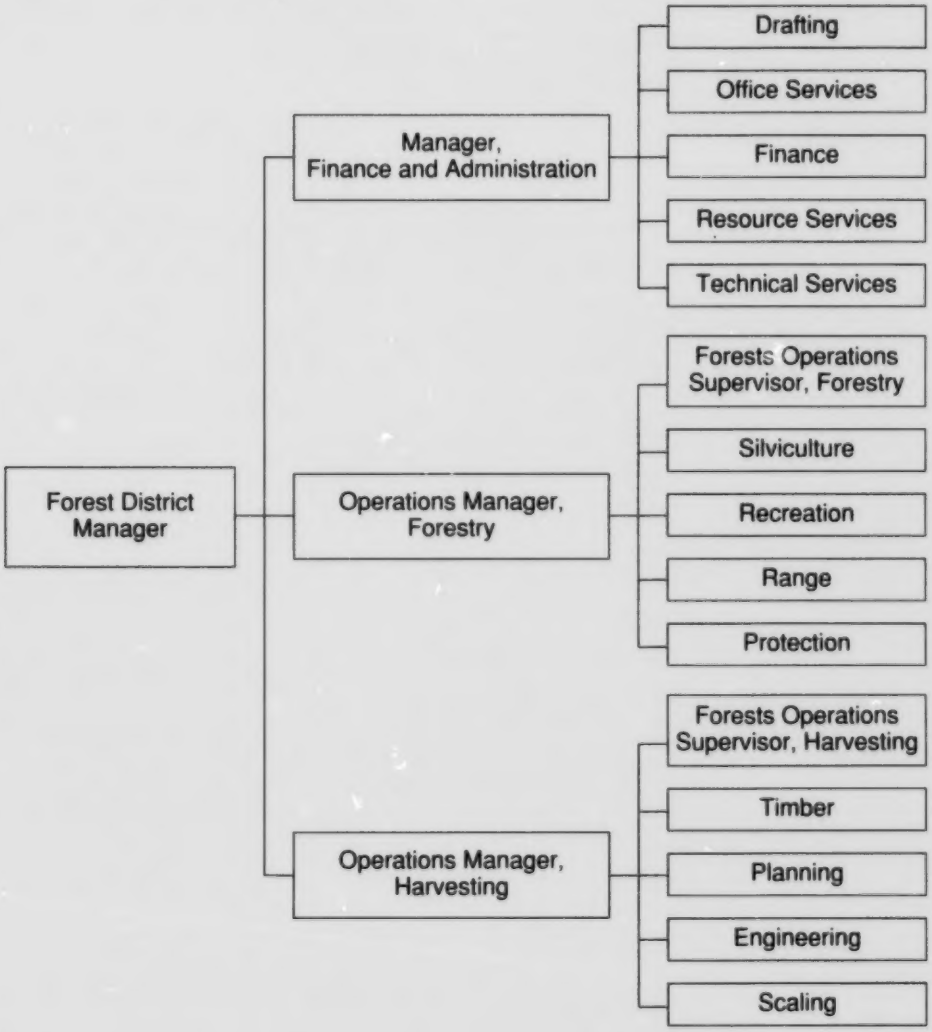


District organization

The province is divided into 43 forest districts, each administered from its own district office by a district manager. Some districts also administer field offices.

The organization of a forest district office is shown below.

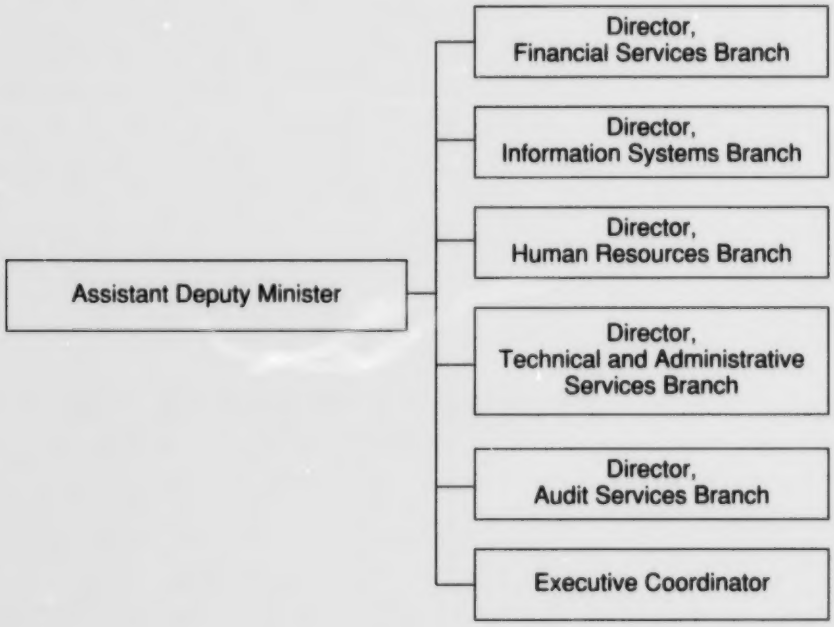
Three district staff managers — for harvesting, forestry and finance and administration — provide advice and services to each forest district manager.



Management Services division

The Management Services Division is comprised of an executive coordinator and five branches, each headed by a director:

- Financial Services;
- Information Systems;
- Human Resources;
- Technical and Administrative Services; and,
- Audit Services.



II. Program reports

Introduction

For convenient comparative reading, the program reports follow, as closely as possible, the structure of the government's Estimates for the 1989-90 fiscal year.

The *Estimates* for the ministry include:

- Vote 27: Minister's Office;
- Vote 28: Ministry Operations;
- Vote 29: Fire Suppression Program;
- Vote 30: Forest Resource Development Agreement;
- A statutory special account for Forest Stand Management Fund;
- A statutory special account for the Small Business Forest Enterprise Program; and,
- A statutory special account for South Moresby Implementation.

The program reports focus on six of the above:

- Ministry Operations;
- Fire Suppression Program;
- Forest Resource Development Agreement;
- Forest Stand Management Fund;
- The Small Business Forest Enterprise Program; and,
- South Moresby Implementation Account.

Ministry Operations — Vote 28

The sub-votes (programs) are:

- Management Services:
  - Senior executive direction and co-ordination of central ministry services, including human resources, finance, audit, systems, accommodation, communications, technical services — *Management Services* (page 16);
  - Public Information and Library Services (page 18);
  - Regional and district program administration in areas of personnel, finance, systems and technical services — *Management Services* (page 17);
  - Grants for activities which promote the forest industry — *Management Services* (page 17); and,
  - Policy and Planning (page 20).
- Harvesting (page 21);
- Industry Development and Marketing (page 23);
- Silviculture (page 25);
- Research (page 28);
- Forest Protection (page 32);
- Integrated Resource Management (page 35); and,
- Inventory (page 39).

Fire Suppression Program — Vote 29

This program (page 41) funds the fighting and extinguishing of forest and range fires and includes related *ex gratia* payments.

The sub-votes are:

- Direct fire fighting; and,
- Fire suppression preparedness.

Forest Resource Development Agreement (FRDA) — Vote 30

This program (page 43) funds provincial spending under the five-year, $300-million, Canada-B.C. Forest Resource Development Agreement.

Special Accounts

- Forest Stand Management Fund *(Table L-1)*:
  - The distribution of expenditures from the Forest Stand Management Special Fund established by the *Forest Stand Management Fund Act, 1986;*
- Small Business Forest Enterprise:
  - This program (page 49), funded by a special account *(Table M-1)*, was established by an amendment to the *Forest Act* in 1988; and,
- South Moresby Implementation (replacement and compensation) *(Table N-1)*.

Management Services

Program description and goals

The program's goals are:

- to provide executive direction and coordination of the ministry's administrative support services for the effective management of the ministry's human, financial, information and physical resources;
- to maintain and enhance the ministry's integrity, reputation, and trusted relationships with central agencies;
- to contribute to the improvement and practicality of central agencies' systems and requirements;
- to provide support services for all resource programs at the region and district levels in the area of finance, personnel, systems, and technical services; and,
- to provide grants to agencies involved in forestry research and the promotion of forest management.

The program's various components include:

- Financial services: to provide financial policies, procedures, training, and direction to ensure high standards of financial management;
- Human resources: to provide quality, integrated, staff services through human resource planning, training, development, recruitment and selection, occupational health and safety, and labor relations;
- Technical and administrative services: to provide a comprehensive range of technical and specialized administrative services for the effective management of the ministry's facilities, vehicles, equipment and radio communication systems;
- Information systems: to provide effective and efficient computer information systems for the ministry's operations and access to other government systems;
- Legal services: to coordinate all appeals and compensation claims under the *Forest Act* and *Range Act* and to advise ministry officials on legal matters or interpretation of legal documents; and,
- Audit services: to provide an effective, independent and comprehensive review of ministry programs and activities as well as conduct special audits on behalf of management.

Client situation

The program's clients are the ministry's executive, managers and employees, the provincial government's central agencies, the public, the forest and ranching industries, and agencies involved in forestry research and in the promotion of forest management.

Activities

During 1989-90, work was continued under the program:

- To simplify and improve the productivity and integration of the financial management policies, systems and processes;
- To upgrade employees' skills;
- To increase the effectiveness and efficiency of the management of the ministry's facilities, equipment, and radio communication systems;
- To give district offices direct access to a number of ministry systems so as to improve communications with the rest of the ministry;
- To undertake a major redevelopment of the ministry's revenue-management policies, procedures, and systems;
- To expand and upgrade current information systems to better meet the ministry's business needs; and,
- To provide expert advice to ministry officials on legal, financial, and technical matters.

Other activities included:

- The operation of six forest regional offices located in Vancouver, Prince George, Smithers, Williams Lake, Kamloops and Nelson, which provided:
  - The development of regional programs and procedures from broad provincial policies;

  - Corporate direction, and professional and technical expertise to assist forest districts in implementing ministry programs; and,
  - The auditing and monitoring of the performance of districts;
- The operation of 43 forest district offices, which were involved in:
  - The delivery of the ministry's programs; and,
  - Revenue collection and reporting;
- Extending grants to:
  - B.C. Forestry Association;
  - Association of B.C. Professional Foresters — Westland Television Program;
  - B.C. Debris Control Board;
  - Junior Forest Warden Program;
  - Festival of Forest Society; and,
  - B.C. Forest Museum.

Expenditures

Forecast expenditures were $98.7 million. Actual expenditures were $97.6 million. The major expenditure was $24.9 million for technical and administrative services *(Table B-1)*.

Effects on clients

This program enhances and promotes the efficient delivery of the other resource programs and ensures that statutory requirements are met (example: *Financial Administration Act, Worker's Compensation Act*).

The program also provides grants to various forestry agencies.

Forecasts

Success in the ministry's key role of forest and revenue management requires effective stewardship of geographic and financial information. Investments in information systems will be required to meet this challenge.

Public Information and Library Services

Sub-program description and goals

This sub-program, funded under the Management Services Program, coordinates the communication of information on the ministry's mandate, goals, organization, policies, programs, products, services, and achievements to:

- Staff (internal);
- The public (external), including:
  - Organized groups and associations;
  - The news media;
  - The forest industry;
  - Forest professionals;
  - Other government agencies;
  - Opinion leaders; and,
  - Universities, colleges and schools.

It also provides:

- An information resource service to staff and the public; and,
- Consultation and advice to staff on communicating information, internally and externally, on the forest and range resources, the ministry's forest and range programs, and forest and range issues.

Client situation

Public concern about the environment has resulted in increased public interest in forest management and the province's forest resources. Public comments on a variety of forest management issues and requests for information on research, integrated resource management, forest management policies, planning and practices, and opportunities to provide input on forest management plans are increasing.

Activities

Communication plans

Annual communication plans for the ministry and the Canada-British Columbia Forest Resource Development Agreement were developed, coordinated, implemented, and evaluated.

Print communications

More than three dozen publications on various topics were printed or reprinted and distributed to all ministry offices, for dissemination to the public and to target audiences.

Also published were the *Five-Year Forest and Range Resource Program 1990-1995*, the ministry's annual report, an internal newsletter, public discussion papers, posters, and recreation site maps.

Media relations

More than 170 news releases, guest editorials, statements from the minister, news features and letters to the editor were distributed to the media, in addition to responding to numerous telephone requests for information.

Visual/electronic communications:

Two large inter-ministry displays for 'Airshow 90' and 'Globe 90' were produced.

Advertising

Newspaper and radio ads were placed to:

- Invite the public to official openings of new ministry facilities and open houses during National Forest Week and at forest region and district offices in many communities throughout the province; and,
- Fire prevention radio ads were updated and distributed to radio stations across the province.

Communications projects under the Canada-B.C. Forest Resource Development Agreement

The ministry worked with the federal government to produce news releases, a 1990 calendar, a quarterly newsletter *Renewal* and a travelling mall display which was also used at the Pacific National Exhibition in Vancouver.

Several materials were produced for use throughout the province during National Forest Week, including a media package, school materials, and a variety of public information materials.

A series of forestry tours were also held around the province.

'Green Gold Grants' program

The ministry coordinated the annual 'Green-Gold Grants' forest-awareness program, launched in early 1987 under the Canada-B.C. Forest Resource Development Agreement.

Under the Green Gold Grants program, more than $92,000 in funding was provided to 108 non-profit organizations throughout the province for forestry-awareness projects.

Special events/promotions

- Official openings for five new ministry facilities and 20 promotional events were organized; and,
- Open houses were held at ministry offices throughout the province during National Forest Week.

Public inquiries

The public affairs branch responded to a weekly average of 500 phone calls as well as 100 written and personal requests for information about ministry programs, products, services and publications.

Library

The ministry's library ordered and catalogued 1,300 new books; handled 6,146 reference questions, directory and library material requests; loaned out 5,760 items; conducted 215 data base searches; obtained 1,177 inter-library loans and distributed 1,526 reprints.

Expenditures

Expenditures were $1.1 million under the Management Services program *(Table B-1)*. This does not include expenditures for projects implemented with other agencies, or ministry programs funded by other sources, such as the Canada-British Columbia Forest Resource Development Agreement.

Effects on clients

Public inquiries and demand for ministry pamphlets, brochures, maps, reports, and other printed material indicated a keen interest in the ministry's programs.

The sub-program's effectiveness was indicated by:

- the news media's use of ministry news releases; and,
- verbal and written responses to newspaper and radio ads.

Positive responses to slideshows, video films, special events, and promotions demonstrated that the public viewed the program as necessary, educational, and informative.

Forecasts

Current research indicates that the public will remain keenly interested in the management of the province's forest and range resources, particularly in the government's role in balancing needs for a healthy economy and environment.

Research indicates that the public will require more information for informed opinions on the management of forest resources.

Policy and Planning

Sub-program description and goals

This sub-program, funded under the Management Services Program, coordinates and develops the ministry's:

- Corporate planning and policy processes;
- Policy responses to current issues;
- Legislative program; and,
- Responses to inter-ministry policy initiatives and external advisory policy bodies such as the Forest Resources Commission.

Client situation

The sub-program's clients are primarily the ministry's executive and senior managers.

Activities

Since its establishment in August 1989, this sub-program has:

- Produced a business plan to provide vision and focus for developing the ministry's 1990/91 budget priorities;
- Conducted background research on various issues such as regulation of private land, tree spiking and range management;
- Helped initiate and guide the Old-Growth Strategy Project; and,
- Coordinated the ministry's presentation to, and continued liaison with, the Forest Resources Commission.

Expenditures

Expenditures were $0.318 million under the Management Services Program.

Harvesting

Program description and goals

The program's primary goal is to make timber available to the forest industry, consistent with approved rates of harvest, and in a way that fulfills the ministry's mandate.

This involves a number of activities, including:

- Operational timber-harvest planning and harvest-plan approval;
- Issuance of licences and cutting authorities;
- Forest road and bridge engineering and development;
- Monitoring harvesting operations; and,
- Timber valuation, scaling, and billing.

Client situation

During 1989-90:

- Approximately 72.4 million cubic metres of Crown timber were harvested under forest tenures in which the harvest rate is regulated. This compares with a total allowable annual cut of approximately 74.3 million cubic metres for these tenures;
- An additional 5.3 million cubic metres of Crown timber were harvested in areas in which the volume harvested is not regulated. These include timber licences outside of tree farm licences, licences to cut, rights of way, beachcomb, trespass and miscellanea. This resulted in a total harvest on Crown land of 77.7 million cubic metres;
- A further 9.3 million cubic metres of timber were harvested from private land, federal lands, and Indian reserves, making a total provincial harvest of 86.9 million cubic metres *(Table C-3)*;
- More than 827 kilometres of new Forest Service roads were constructed, bringing the total to more than 33,733 kilometres *(Table C-9)*;
- Nearly 8,154 kilometres of these roads were improved, upgraded, and maintained *(Table C-10)*;
- Bridges and major culverts — an integral part of the Forest Service roads network — increased by nearly 186 to a total of 3,279 *(Table C-11)*; and,
- Logs exported *(Table C-6)* decreased by about 40 per cent to 1.6 million cubic metres, continuing last year's trend.

Activities

The program made timber available to the forest industry by assisting in operational timber-harvest planning and approving timber harvest plans.

Licences and cutting authorities were issued and administered. Table C-7 gives the number of licences administered. Table C-8 indicates volumes committed by form of commitment.

The program assisted in road and bridge engineering and development. Staff also monitored harvesting operations and carried out timber valuation, scaling, and billing.

Forest revenues

Revenues, including stumpage collected from more than 1,000 licensees, rents and fees, royalties, export fees and scaling fees, amounted to $ 496.8 million *(Table 1)*. It excludes revenues from the Small Business Forest Enterprise Program.

Stumpage charges were the main revenue source accounting for $434.8 million.

Stumpage charges for non-competitive licences averaged $7.43 per cubic metre, up nine per cent from the previous year *(Table C-2)*.

Expenditures

Actual expenditures were $50.9 million. The major expenditure was $15.9 million for engineering and roads *(Table C-1)*.

Effects on clients

Additional timber volumes were made available under the competitive timber program, creating new opportunities for

small business forest enterprises (see program report on Small Business Forest Enterprise).

One new pulpwood agreement was issued, providing a supply of pulp timber to support an increase in pulp-production capacity in the province.

Forecasts

Harvest levels, on a provincial basis, are expected to decline in 1990-91 due to a weakening demand for most forest products.

Industry Development and Marketing

Sub-program description and goals

This sub-program, funded under the Harvesting program, analyzes opportunities for maintaining and expanding the forest products industry.

Its goals are:

- To develop policies to promote and enhance the industry's position in manufacturing, product development, and domestic and international trade;
- To provide information and liaison services for potential investors;
- To propose legislation and related programs to encourage a vigorous, efficient, and world-competitive forest industry; and,
- To provide funding for forest products research.

Client situation

The industry operated at or near capacity throughout most of 1989:

- Total shipments increased slightly to $12.5 billion;
- After-tax profits of the publicly traded forest products companies based in the province, totalled about $650 million, down 25 per cent from 1988; and,
- Intended capital and repair expenditures totalled $3.2 billion, exceeding the record $2.5 billion spent in 1988.

Lumber

Lumber production decreased slightly to 15.2 billion board feet. Prices for spruce-pine-fir 2 x 4s averaged about US$184 per 1,000 board feet (MBF), with a range from roughly US$176 per MBF to US$190 per MBF, down slightly from 1988 levels.

The North American lumber market was generally weaker in 1989 as U.S. housing starts declined from 1.5 to 1.4 million units.

The weakness in the North American lumber market was partially offset by increased shipments to offshore markets, such as Japan. Offshore lumber exports increased by approximately two per cent in 1989.

Pulp

Market kraft pulp shipments were down by four per cent to 3.7 million tonnes. Prices for northern bleached softwood kraft pulp increased to U.S. $840 per metric tonne during the first quarter of 1989 and remained at that level for the remainder of the year.

Newsprint

Newsprint production increased by two per cent to a record level of 1.7 million tonnes.

An attempt by producers to raise newsprint prices in 1989 failed due to slow consumption growth in the U.S. and additional newsprint capacity being brought into production during the year. By year-end 1989, newsprint prices were down by about seven per cent to U.S. $540 per tonne from U.S. $590 a year earlier.

Plywood

Plywood production was 1.8 million cubic metres (or 2.1 billion sq. ft., 3/8" basis), about the same as in 1988.

More than 80 per cent of the plywood produced is used domestically. Canadian housing starts in 1989 were 215,000 units, or about three per cent less than the previous year.

Shakes and shingles

Exports of shakes and shingles, more than 90 per cent of which go to the U.S., increased by about nine per cent.

The 35 per cent duty imposed by the U.S. in June 1986, is being reduced in stages over a five-year period. For most of 1989, the rate was 20 per cent, but declined to 10 per cent by year's end.

Importance and opportunities

The forest industry accounted for close to 50 per cent of the value of shipments from all manufacturing industries in the province. Approximately 80 per cent of the forest products were exported.

Nationally, the province accounted for more than 45 per cent of the $ 22.6 billion of exports in the forestry sector.

The industry has opportunities to:

- Diversify export destinations;
- Expand specialty, secondary, and tertiary milling of solid-wood products; and,
- Use previously non-commercial tree species, such as aspen and alder.

Activities

The program's activities included:

- Meetings with investors to explore opportunities in the forest products industry;
- Review of proposals for new forest licences and pulpwood agreements;
- Provision of economic advice and analysis of forestry-related issues;
- Presentations to seminars and trade conventions;
- Funding support for wood-products research;
- Review of forestry projects in the Major Project Review Process;
- Review of trade issues affecting the forest products industry; and,
- A comprehensive mill residue study to determine the amount and nature of residue and potential uses.

Expenditures

Branch expenditures were $6.8 million. The major expenditure was $6.0 million to support wood-products research *(Table C-1)*.

Effects on clients

The industry is actively expanding, introducing new manufacturing processes and products, and investigating the large-scale use of aspen and alder, previously considered non-commercial fibre.

Forecasts

The industry is expected to become more diversified and world-competitive, with expanded trade in world markets.

Silviculture

Program description and goals

The overall silviculture program (see 'silviculture activity summary' — page 56) involves restocking denuded forest lands and improving the value and productivity of forest stands through these treatments:

- Restocking — artificially (by planting and seeding) and naturally (by seeding) — harvested areas and lands denuded by wildfires, pests and other damages (referred to as 'denuded lands');
- Preparing sites to promote natural restocking and to help in planting;
- Brushing some stands to ensure unimpeded seedling growth;
- Spacing of trees, freeing older conifers from competition, and fertilizing selected forest stands to improve their value and productivity; and,
- Surveying to monitor growth and survival on an operational basis.

The ministry vote provides funding for a portion of the total silviculture program and has four components:

- Silviculture operations;
- Nursery operations;
- Seed operations; and,
- Fire and pests.

Each component's goals are given in each activity section.

Client situation

The general client group, the forest industry, and its specific clients, silviculture contractors — were used to the fullest extent in field activities.

Except for surveying, all operations were contracted to the private sector.

Activities

Basic silviculture

This component involves restocking areas harvested under the Small Business Forest Enterprise Program and by licensees between January 1, 1982, and October 1, 1987.

Activities included surveying, preparing sites, planting, and brushing.

Accomplishments on Crown land, relative to goals, were:

Activity	Goals[1]	Accomplishments
	------- hectares -------	
Surveying	448 263	375 917
Preparing sites	52 102	42 603
Planting	111 727	92 921
Brushing	54 992	37 464
Spacing[2]	5 565	5 915
Other[3]—	4 588	
	------ thousands ------	
Seedlings planted	120,654	114,984

1. Regional revised targets from published goals.
2. Includes spacing of young conifers and falling of diseased and damaged trees.
3. Includes pruning, controlling mistletoe, and falling snags and residual trees.

Table D-2 outlines these accomplishments by forest region, funded under the ministry vote for silviculture operations.

During 1989-90, the ministry and licensees were responsible for:

- Surveying approximately 376 000 hectares of recently denuded lands for stocking, plantability, survival and stand tending. The survey information is used to develop plans for reforestation and stand-improvement projects and to initiate seedling-production requests and to update records, inventory data bases and forest-cover maps — all used for annual reports, timber supply analyses and allowable cut projections;
- Preparing sites for natural regeneration and planting on over 43 000 hectares;
- Planting approximately 115 million trees on 93 000 hectares of Crown land which was denuded between 1982 and October 1, 1987;
- Brushing treatments to control undesirable vegetation in young stands on about 37 000 hectares;

- Carrying out spacing on 6 000 hectares where stand density has limited tree growth; and,
- Other treatments such as pruning, controlling mistletoe and falling snags and residual trees on 5 000 hectares.

Table P-8 shows average costs of basic silviculture treatments.

Nursery operations

The provision of seedlings for reforestation has undergone a major change — from all seedlings being grown in ministry nurseries to the majority being grown in private-sector nurseries.

Prior to the fiscal year, a policy decision limited the 11 ministry nurseries — of which eight were privatized in 1988-89 — to the production of 100 million of the total seedlings required annually. Today, all seedlings, with the exception of those for the Small Business Forest Enterprise Program, catastrophic losses and other ministry needs, are grown by commercial or licensee nurseries.

During 1989-90:

- 298 million seedlings — 32 million in ministry nurseries (prior to privatization) and 264 million in private nurseries — were sown, with 224 million scheduled for planting in 1990-91;
- Of the 298 million seedlings sown, 57 per cent were for ministry needs;
- About 86 per cent (or 258 million seedlings) of the 298 million seedlings were sown in containers, nine per cent as container/bareroot and transplant seedlings, the rest as bareroot stock;
- Container-grown spruce and pine were the most requested stock type; and,
- To compete successfully with brush on productive sites, larger and more mature planting stock is required. This fiscal year, 78-million two-year-old container/bareroot stock were requested for planting in mid 1990 and 1991.

Ministry nurseries

To increase the supply of larger planting stock, container operations were expanded to produce more two-year-old container seedlings. Work continued on testing and constructing new equipment to increase productivity and testing new cultural methods to produce better stock.

During 1989-90, ministry nurseries sowed 32 million seedlings of which about 21 million were two-year-old container or container/bareroot transplant seedlings.

Private nurseries

Commercial and forest company nurseries sowed about 266 million seedlings, of which 25 million were bareroot.

Forest company nurseries sowed 38 million seedlings.

Seed operations

This activity provides seed for all nurseries.

Seeds are collected from natural stands and seed orchards. They are occasionally also bought from out-of-province suppliers for operational and research use.

During 1989-90, there was:

- A medium crop in natural stands;
- A medium-to-heavy crop in seed orchards (although there was a medium-to-heavy crop in seed orchards, seed production was down due to cone and seed insects);
- 3 071 kilograms of seed added to the provincial seed inventory;
- 5 091 kilograms of seed withdrawn, leaving an expected inventory of 47 157 kilograms of all native species after the 1990 spring sowing (species breakdown in *Table P-9*);
- Of the 47 157 kilograms in storage, 36 353 kilograms are ministry owned and the remaining 10 834 kilograms are privately owned; and,
- 44 orchards, covering 116 hectares, managed under cooperative orchard programs — 22 ministry orchards on 69 hectares and 22 industry orchards on 47 hectares.

Forest Act amendments, requiring major licensees to pay the seed cost for areas harvested after October 1, 1987, are having a major impact on the cooperative orchard program.

In February 1988, the ministry served notice that effective April 1, 1990, the seed orchard agreements, which granted funds to industry-managed orchards via credits against stumpage accounts, would be cancelled. The ministry has now signed cooperative agreements with two private-seed orchards in return for a percentage of seed.

Fire and pest sub-program

The fire and pest sub-program provides for basic silviculture on forest land denuded by wildfires, insects and disease. These activities prevent a reduction in the productive forest land base by ensuring denuded lands will be restocked.

An estimated 25 000 hectares currently require reforestation under this sub-program. Reforesting this area will prevent the build up of a new backlog of unreforested land. This sub-program is a legal requirement under the *Forest Act*.

Activities included surveying, site preparation, planting and brushing. Accomplishments on Crown land were:

- Surveying 1 187 hectares;
- Planting 49 hectares;
- Spacing [1] 146 hectares.

- - thousands - -

- Seedlings planted 71

1. Includes juvenile and sanitation spacing.

Table P-11 gives these accomplishments by forest region, funded by ministry vote for silviculture operations.

During 1989-90, the ministry and licensees were responsible for:

- Surveying about 1 000 hectares of recently denuded lands for stocking, plantability, survival and stand tending. The information is used to plan reforestation and stand-improvement projects; to initiate seedling production requests; and, to update records, inventory data bases and forest-cover maps — all used for annual reports, timber supply analyses and allowable cut projections;
- Planting approximately 71,000 trees on 49 hectares of Crown land lost to fires and pests; and,
- Carrying out 146 hectares of juvenile spacing on stands with repressed growth due to excessive densities.

Table P-8 shows average costs of basic silviculture treatments.

Expenditures

Forecast expenditures under Ministry Operations (Vote 28) were $151.8 million. Actual expenditures were $134.7 million *(Table D-1)*.

Effects on clients

With privatization of eight ministry nurseries in 1989-90, the involvement of silviculture contractors increased substantially.

Forecasts

Recent policy changes have shifted financial responsibility for substantial parts of the program to the private sector.

Overall, silviculture investment will expand, with the private sector providing an increasing share.

Government expenditures through the Ministry Operations (Vote 28) will drop significantly after the ministry has completed its obligations on past harvests.

Research

Program description and goals

The program addresses complex forest resource management issues by providing research support to achieve the ministry's operational goals and transferring research findings into operational practice.

The goals are:

- Forest renewal research: to develop techniques and guidelines to cost-effectively restock forest sites so that future wood supplies are available and other resource values are protected.
- Forest productivity and decision-support research: to provide managed-stand yield tables for use in determining the allowable cut and election of optimal silviculture regimes and to develop decision-support tools to assist forest managers in making the best strategic and operational decisions.
- Integrated resource management research: to address key forest and range resource problems, taking into consideration the impact of forestry practices on wildlife and fish habitats, old-growth forests, climate, soils, hydrology, recreation, and the visual landscape.

Client situation

Programs are guided by client advisory committees, including the B.C. Forest Research Advisory Committee, regional research advisory committees, coast and interior tree-improvement and forest-productivity committees, as well as nursery technical committees.

Many co-operative projects are underway with the forest industry and other agencies and institutions throughout the province, including the University of B.C., Simon Fraser University, the University of Victoria, Forestry Canada, Agriculture Canada, Fisheries and Oceans Canada, the Ministry of Environment, Forest Engineering Research Institute of Canada, FORINTEK Canada Corporation, the U.S. Forest Service, and several special-interest groups.

Activities

The program has three sections:

- Forest renewal;
- Forest productivity and decision support; and,
- Integrated resource management.

It is complemented by two support sections: finance and administration, and technical support services.

Forest renewal research

Maintenance and assessment of the extensive network of research plantations established throughout the province continued. Findings, which will benefit ministry and industry's operational planting programs were communicated through reports, technical workshops, field consultation and other approaches to maximize awareness and utility. New projects are underway to increase knowledge of regeneration in selectively-cut forests and how hardwoods (e.g., alder, birch and aspen) can be established and managed.

The aim of forest renewal research projects is to solve challenging regeneration problems and increase forest productivity through integrated-use objectives.

These were some of the activities:

- New studies to explore options to the clearcutting silvicultural system were established in all six forest regions;
- Frost-hazard guidelines were prepared to improve planting success in the Cariboo region;
- The complex salal and alder interactions with conifer productivity continue to be intensively studied in the Vancouver region;
- A large 'benchmark' trial of site preparation and planting options for high-elevation reforestation was completed in the Cariboo region;
- Field-grown western larch was successfully treated with growth hormones and a girdling treatment to stimulate more seed production and provide a way to reduce the seed shortage until orchard seed production begins;

- Pollen management trials were completed for interior spruce, lodgepole pine and Douglas-fir to demonstrate optimum conditions for storing and testing pollen for seed-orchard use; and,
- Seed collections of yellow cypress, western redcedar, western hemlock and Sitka spruce continued along the Pacific coast (Alaska, B.C., Washington and Oregon) as the basis for new studies into seed origin, tree gene resource management and improvement of planting stock.

Forest productivity and decision support

Existing silviculture field experiments were re-measured and analyzed and several new experiments were started. This information provided data on the selection of optimal silvicultural treatments and actual data required to validate growth models.

Work continued on stand-growth-model development with new research conducted on future wood quality and the impact of pests on yield. Forest management research focused on the impact of pests and fires.

Specific activities:

- Re-measured 53 permanent sample plots in pre-commercially thinned Douglas-fir, and thinned and fertilized Douglas-fir and western hemlock stands;
- The analysis of the nine year basal area response of thinned and fertilized coastal Douglas-fir and western hemlock plots was completed;
- A joint Forestry Canada-B.C. Forest Service paper entitled *The effect of spacing on Sitka spruce weevil damage to Sitka spruce* was published in the *Canadian Journal of Forest Research*;
- Two white spruce trials and a pre-commercial thinning trial for interior Douglas-fir were established;
- Investigated the effect of juvenile spacing, commercial thinning and other treatments on the yield of several commercial species;
- Evaluated the merits of pruning Douglas-fir for wood quality and financial return;
- Developed models for assessing the benefits of stress grading lumber and predicting the impact of wood rot on the yield of coastal Douglas-fir;
- Produced interim managed stand and product-yield tables for lodgepole pine;
- Produced site-index curves for interior species;
- Provided information for Silviculture Branch to help reduce seedling shipping costs. Identified annual savings are $100,000 to $200,000;
- A prototype forest simulator was developed to investigate the effects of mountain pine bark beetle infestation on the Merrit Timber Supply Area. Incorporation of these techniques into the timber supply planning process is continuing;
- An analysis of the pest risks associated with juvenile spacing of lodgepole pine identified how an improved database can result in significant cost savings; and,
- Studies have been carried out in conjunction with the University of Victoria, University of B.C. and Cornell University on the effects of fire risk on juvenile spacing, estimating historical forest fire rates and determining the ideal amount of old-growth stands.

Integrated resource management research

The Integrated Resource Management Research section continued its research into forest management effects on non-timber resources and began new work on the development of an old-growth strategy.

Demand for consultation services was high. The ecological classification system, developed over the past 15 years, has become the framework for forest management decision making.

Particular accomplishments for the year:

- Helped develop an inventory of old-growth timber and forest ecosystems;
- Continued correlation of ecosystem classification and interpretation;
- Produced several maps and six regional field guides based on the ecosystem classification;
- Initiated new research on stream channel changes and sediment budgets;
- Continued a program to evaluate the impact of timber harvesting and landslides on fish habitat;
- Initiated a study on the role of large, woody debris in stream channels in various biogeoclimatic zones as part of the old-growth research program;
- Conducted surveys on the amount of soil disturbance from the different harvesting systems in the interior;

- Completed field guides to determine soil sensitivity to mass wasting, compaction and surface erosion and for minimizing site degradation from harvesting operations;
- Completed a field guide on management of unstable terrain;
- Continued retrospective surveys of tree productivity on skid roads and clearcuts;
- Began a study on how climate change can affect forest growth and management;
- Began studies of wildlife diversity in clear-cuts, young-growth and old-growth forests on the lower mainland and Queen Charlotte Islands;
- Began field work for a three-year grizzly bear study in the Khutzeymateen River valley;
- Initiated a new wildlife habitat research program at the Red Rock Research Station near Prince George;
- Continued research on habitat relations of deer, elk and grizzly bears on the coast and developed management guidelines for forestry interactions;
- Continued research on deer in the Cariboo region and on use by other wildlife species of thinned Douglas-fir forests;
- Preliminary results of a FRDA-sponsored forest-grazing research project were extended to range and forest managers;
- Research on the effects of fertilizers on range forage is near completion; and,
- Conducted 15 workshops on developing interior timber harvesting.

Technical support group

The Technical Support Group assisted forest researchers by supplying and maintaining systems support, biometrics, extension and demonstration as well as research facilities.

- Research stations continued to provide information to the public through hosted tours for visitors from B.C., other provinces and other countries, in addition to the distribution of brochures and other printed material;
- The Cowichan Lake Research Station marked its 60th anniversary this year;
- The efficiency of the Analytical Laboratory was doubled by introducing computers and software to gain full use of modernized instrumentation and methods;
- Communication and Extension Services produced more than 30 publications, and approximately 500 extension, support and demonstration materials. Over 33,000 copies of the branch's extension and support publications were distributed; and,
- Statistical and systems training was provided to increase researchers' knowledge and use of computer-based statistical applications for data.

Expenditures

Forecast expenditures were $11.4 million. Actual expenditures were $11.3 million. The major expenditure was $3.7 million for regional sciences (*Table E-1*).

Effects on clients

Forest renewal research

Examples are:

- The mechanical site preparation research findings now being used in the Cariboo and Kamloops regions to improve reforestation effectiveness on dry and high-elevation sites;
- The techniques to successfully stimulate a non-performing seed orchard at Skimikin into cone/seed production;
- The use of long-term seed origin studies to update seed-transfer guidelines for B.C.; and,
- The successful application of 'blackout' nursery technology to improve the growing of conifer seedlings in northern B.C.

Forest productivity and decision-aids research

The production of managed-stand-yield tables and site-index curves enabled clients to make informed management and timber-supply decisions as well as improve the selection of stand-tending treatments.

Integrated resource management research

Clients benefited from correlated ecosystem classification, management interpretations and such extension products as maps and field guides. The use of old-growth research and publication information helped in the development of an old-growth management policy.

Similarly, clients benefited from the development of recommended procedures to integrate wildlife and forestry management.

A computer model was created to determine the sensitivity of watersheds to timber harvesting.

Forecasts

The demand for research solutions, particularly those addressing high-impact forest-management issues, has increased over the past five years. This trend is expected to continue.

Ensuring a future wood supply with sound reforestation practises will continue to be the driving force behind forest renewal research.

Forest productivity and decision support, created to address operational efficiency issues, will continue to generate tools to aid in management decisions.

Multiple-use issues and questions will continue to receive major attention. Wildlife habitat, management of old-growth forests, wilderness preservation and access for non-forestry use will be some of the areas addressed by integrated resource management research.

The research program will continue its extensive and ongoing cooperation with other government agencies and universities. It will also continue its emphasis on addressing client-oriented, high-impact problems and delivering workable solutions.

Protection

Program description and goals

The program's purpose is:

- To protect the forest and range resources from damage by fire, forest insects and diseases;
- To protect life, property, and other natural resource values from fire; and,
- To support silviculture site treatments, and range and wildlife habitat creation and maintenance, by using prescribed fires.

The ministry is responsible for all aspects of fire suppression and fire management. Fire suppression activities range from fire monitoring and detection to fire management and site rehabilitation. The forest industry and contract fire suppression crews also contribute to program delivery.

The fire management program focuses on providing management personnel and operational staff to the fire as well as the administration of the prescribed burn and smoke management programs. The cooperation of other ministries, agencies and the forest industry is essential in fulfilling this mandate.

The forest, ranching and wildlife industries cooperate with the Forest Service and Ministry of Environment to conduct prescribed burns.

The fire management goal is to limit the annual area burned to 69 000 hectares and timber losses to 2.6 million cubic metres.

This goal was achieved in 1989-90: 25 380 hectares were burned and about 1.8 million cubic metres were lost.

The forest management goal is to reduce timber losses due to insects and diseases.

During 1989-90, defoliators and bark beetles attacked approximately 390 000 hectares. An estimated 2.7 million cubic metres were lost. An estimated 3.0 million cubic metres were lost due to root diseases and mistletoe.

Client situation

The primary clients are other ministries, provincial and federal programs, as well as the forest industry and general public.

Activities

Fire management

All activities relating to fire-fighting preparedness, forest-fire prevention, and organizational support for forest-fire suppression are included.

The ministry:

- Maintained its forest-fire detection systems and continued to upgrade the electronic lightning location system;
- Encouraged, through media ads and the Zenith 5555 toll-free phone number, public assistance in detecting and reporting wildfires and support remained high;
- Continued fire-prevention programs including:
  - School programs; and,
  - Smokey Bear's numerous appearances across the province;
- Dealt with the growing urban-wildland fire problem through program planning as well as the more effective use of equipment, crew training and the development of strategies;
- Researched, updated, and improved fire-fighting equipment;
- Continued the fire-suppression training program; and,
- Maintained specialty teams such as the overhead and fire-information support teams. The Unit Crew program was expanded due to the high level of performance by the fire fighters.

Forest Health Program

This program, previously called pest management, includes all activities associated with forest diseases, insects and vertebrate pests.

The ministry:

- Conducted aerial and ground surveys to detect and quantify major pest infestations. These included:
  - A province-wide detection survey for gypsy moth including the placement of 2,000 traps. This work was done in conjunction with Agriculture Canada;
  - Trapping and egg mass surveys for the Douglas-fir tussock moth in the southern interior;
  - Aerial surveys, in cooperation with Forestry Canada, to detect pests in forests; and,
  - Ground and aerial surveys for a number of root diseases.
- Appraised damage, including:
  - Assessment of root diseases in long-term growth and yield plots on Vancouver Island and in the Kamloops forest region; and,
  - Development of the stand-growth models Tree and Stand Simulator (TASS) and PROGNOSIS to show the effects of root diseases and other pests.
- Continued the emergency bark beetle program to:
  - Define the extent of the continuing mountain pine beetle problem. (The outbreaks were confined to about 53 000 hectares, the lowest level since 1977); and,
  - Support surveys, suppression and containment projects through $3.2 million in funding.
- Conducted a major program review involving:
  - An intensive technical audit of the Penticton forest district's bark beetle management program.
- Developmental work was done to:
  - Define a planning framework to formulate area-specific bark beetle management strategies; and,
  - Test the effectiveness of the bacterial insecticide Bt.k on blackhead budworm in the Vancouver forest region as well as on the eastern spruce budworm in the Prince George forest region.

The ministry representative on the B.C. Pesticide Control Committee reviewed 486 forestry-related pesticide use applications and made recommendations to the Ministry of Environment; 193 of the applications were from the Forest Service and 293 were from the forest industry.

Air Operations

Total ministry expenditure for aircraft and aviation support for all ministry programs was $33.1 million:

- $4.8 million on forest-protection flying, fertilizing, seeding, spraying, forest health, and other forestry field activities; and,
- $28.3 million on fire suppression activities:
  - $25.7 million for fire-suppression flying, air-tanker flying, helicopters, aerial detection and transport; and,
  - $2.6 million for air tanker base operations and development.

Air tankers acted on 552 targets (15.7 per cent of total fires), providing initial action or support to ground forces on fires.

Air tankers were released to assist the Northwest Territories, Saskatchewan, New Brunswick and the U.S.; helicopters were released to assist the Northwest Territories and Yukon.

Capital works projects undertaken were:

- A new air base was completed at Fort St. John, including an office, retardant storage buildings, air tanker loading and parking areas;
- A new office building at Abbotsford;
- An underground aviation fuel system at Punzi Mountain; and,
- A water well at Burns Lake.

Planning, development and research

Technical and related support was provided in fire-management information systems, prescribed fire use in forest management, forest health in forest planning, weather data collection, provincial lightning-location systems, air-operations-information systems and provision of user support for all protection systems. The ministry:

- Installed the Advanced Fire Management System in all regional and district offices;
- Continued with the development of a computer-based expert system to assist in prescribed fire decision making;
- Upgraded the electronic lightning location system by converting four of 25 direction finders to the Advanced Lightning Direction Finder Technology and adding a new one to increase detection efficiency;

- Enhanced the fuel management/burning ledger system; and,
- Carried out a major study, in cooperation with the Ministry of Environment, Forestry Canada, Environment Canada, University of Washington and U.S. Forest Service, to evaluate the nature and dispersion of smoke plumes from prescribed burns.

Expenditures

Expenditures were $17.3 million (*Table F-1*).

Effects on clients

By achieving its goals, the program had a positive impact on its clients. No adjustments to projected harvesting plans were required.

Forecasts

Annual fire starts will continue to increase, with man-caused fires being primarily responsible. The prescribed burning program is expected to level out during 1990-91.

Increased emphasis on smoke management will also be required.

The ministry is carefully considering the effects climatic change can have on the fire suppression program. The wildfire statistics data base shows a steady increase in the relative number of lightning-caused fires during the last three decades. This might indicate a shift in lightning-caused fire starts or it could be the result of more efficient fire detection.

The western spruce budworm outbreak near Kamloops will remain about the same size as 1989. Otherwise, defoliators are not expected to be a major problem.

The mountain pine beetle has great potential to expand and can only be contained with an aggressive suppression program. Douglas-fir and spruce beetles also have the potential to further expand their influence.

New contracts will be tendered to provide guaranteed availability of scarce, specialized aviation resources and lower flying charges for other ministry programs.

Integrated Resource Management

Program description and goals

The program manages range and recreation resources, integrates their management with timber production and other provincial resources, and coordinates the forest planning process.

Under this program, the ministry:

- Prepares integrated resource plans;
- Maintains a dialogue with resource agencies, the forest and ranching industries, and the public on objectives and management priorities;
- Ensures sound stewardship of forested and non-forested Crown rangelands;
- Administers range tenures for forage-use by livestock, and gets a fair price for Crown forage;
- Protects provincial forests' recreational values, including landscape aesthetics and wilderness; and,
- Provides recreation sites and trails in provincial forests for public use.

Client situation

The program services diverse clients by setting standards of resource stewardship and by producing management plans.

Major clients are the resource and tourism industries, the public and other agencies.

The program gives beef cattle producers, guides/outfitters, and other tenure holders access to rangeland forage — almost one million months of grazing for livestock. Numerous wildlife species use additional forage.

Developed recreation site and trails in provincial forests support the reported 1.8 million recreation user days of activities. Another 40 million user days are dispersed over the provincial forest lands.

Recreation resources are inventoried, planned and protected.

Activities

There are three sub-programs — resource planning, range management, and recreation management — each with their own mandate. These sub-programs complement each other to achieve a holistic approach to resource management.

Resource planning

Resource planning achieves integrated resource management by:

- Preparing strategic and local resource-use plans;
- Coordinating inter-agency dialogue;
- Consulting the public on forest resource planning;
- Addressing environmental protection issues; and,
- Recommending timber harvesting rates.

Plans are prepared or approved for:

- 35 timber supply areas;
- 32 tree farm licences; and,
- More than 200 local resource-use plans.

On April 1, 1990, the allowable annual cut was 56.1 million cubic metres from timber supply areas and 18.8 million cubic metres from tree-farm licences.

The actual annual harvest deviates from the allowable annual cut due to market demand, but is required to meet cut-control limits over a five-year cut-control period.

Range management

This sub-program emphasizes the protection and conservation of rangeland ecosystems, while providing for their use by livestock, wildlife, and other resource objectives.

Cost-effective management initiatives were used to enhance forage production and improve its quality.

The ministry:

- Administered 1,625 permits, 423 licences for grazing, as well as 55 permits and 93 licences for hay cutting. The grazing permits and licences for livestock authorized 974,415 animal-unit-months, 4,165 less than in 1988-89;

- Kept the range-ground rent at 20 cents per animal-unit-month, the same as in 1988-89, but decreased the grazing fee (relative to the previous year's cattle prices) from $1.55 to $1.48 per animal-unit-month in accordance with the fee formula which reflects the selling price of cattle;
- Seeded 1 120 hectares of disturbed forest and 4 502 hectares of grassland for grazing and to control erosion;
- Carried out weed control — principally for knapweed and thistles;
- Continued research on the biological control of knapweed and other weeds;
- Finalized the range component of the pre-harvest silviculture prescription;
- Initiated data analysis of a range inventory project in Nelson forest region;
- Held a policy and procedures workshop for all staff;
- Drafted and discussed 12 range policies;
- Conducted a range-program review;
- Evaluated procedures for environmental monitoring in range and wildlife habitat management; and,
- Completed a draft procedures manual for habitat monitoring.

Table G-4 details range improvements on Crown land; those financed without provincial assistance are not included.

Recreation management

This activity provides the public with opportunities for recreation experiences in provincial forests.

It protects and manages the use of recreational values including forest landscapes, wilderness and aesthetic values.

It also provides over 1,300 recreational sites and 5 000 km of trails for the public's use.

During the year, Forest Service recreation staff:

- Received approval for and released a wilderness policy for provincial forests;
- Initiated a wilderness systems plan including:
  - the development of a GIS based wilderness inventory;
  - the release of a draft wilderness management plan for Height-of-the-Rockies area for public review; and,
  - the submission of recommendations to government for wilderness designation of the Swan Lake area.
- Carried out landscape analyses for various planning processes including the Quesnel-Barkerville corridor, Carmanah Valley, Robson Bight and other major planning studies;
- Comprehensively revised and updated the recreation manual in draft form;
- Conducted a 10,000 sample of British Columbia residents to estimate the recreational use, value and demand for recreation on provincial forests;
- Conducted three recreation surveys for use in local planning studies;
- Maintained a province-wide network of recreation sites and trails by:
  - routine maintenance of 1,306 sites and 571 trails;
  - rehabilitation of 96 sites and 74 trails; and,
  - development of 72 sites and 25 trails.
- Informed the public of recreation opportunities in British Columbia's provincial forest lands through brochures, posters and local media;
- Enforced rules and regulations on sites and trails by using the RCMP and legal system as well as providing positive reinforcement through peer pressure;
- Interacted with recreation users through 1,000 person days of meetings and discussions;
- Was responsible for or participated in over 600 plans;
- Reviewed and made recreation values recommendations on over 4,700 Ministry of Forests licences and other agency plans;
- Worked on 26 recreation-corridor studies and participated with the Ministry of Parks in a review of the recreation-corridor program;
- Maintained a province-wide inventory of British Columbia's provincial forest recreation resources by updating approximately 500, 1:50 000 recreation inventory maps; and,
- Participated in the initial development of the recreation component of the Forest Tenure Administration System.

Expenditures

Expenditures were $ 16 million *(Table G-1)*. The major expenditure was $ 5.4 million for range management.

In addition to these direct ministry expenditures, there was additional support for range improvement activities from ranchers. Also, the ministry's recreation program provided a major outlet for government employment programs and volunteer recreation work.

Cooperation or sponsorship by ministry recreation staff in such programs led to expenditures of $1 million by these non-ministry volunteer workers.

Effects on clients

The needs and priorities of individuals, regional districts, municipal councils, interest groups (such as the Outdoor Recreation Council of B.C.), industry groups (such as the B.C. Cattlemen's Association and forest licensees), and resource agencies were assessed in resource-planning activities.

This interaction responded to diverse concerns and suggestions on forest land-use. Alternative uses were evaluated and allocation, access, and resource-conflict issues were addressed.

. Weed-control efforts were conducted in co-operation with other provincial ministries, regional governments, and Indian bands.

The recreation management activity provides the public with opportunities for recreational experiences in provincial forests and protects and enhances resource values, which are the basis for the province's $2 billion tourist industry, the forest industry, and the $1 billion recreation sports industry.

It supports the forest industry by allowing timber harvesting in visually sensitive areas through landscape management and by reducing wildfires caused by the diverse recreational use of provincial forests.

It also facilitates the public's recreational use of the forests through the management of resource-use conflicts and by providing a system of rustic, backcountry sites and trails.

Forecasts

- To date, relatively stable cattle prices have encouraged cattle producers to maintain herd sizes;
- A provincial weed coordinator will be hired to coordinate and manage the range sub-program weed control and research activity;
- A study of community pasture management will be undertaken;
- A strategic plan for the range sub-program will be prepared;
- Range policies and procedures will be developed to address issues identified in the program review;
- Range program focus will be consistent with recommendations of the program review;
- A detailed, internal review of the recreation management activity will be conducted to confirm its focus is consistent with government, industry and public priorities;
- A wilderness-system plan identifying wilderness study areas will be approved and implemented;
- A report on the provincial GIS wilderness-rated inventory will be produced and distributed;
- Broad percentages of timber resource net downs for visual-quality classes will be established;
- A landscape symposium will be held to train Forest Service and non-Forest Service personnel in forest landscape management;
- A study, including four focus groups, an 800-sample telephone survey of B.C. residents and a workshop of recreation professionals, will be conducted to assess public preferences and satisfaction regarding Forest Service site and trail management;
- Level 2 and 3 brochures will be produced and distributed to the public. Level 3 brochures will be printed to the new Forest Service standard;
- The recreation manual will be finalized and distributed to each ministry office and applicable licensees;
- A proposed policy framework for a ministry interpretative forest program will be developed;
- Development of the recreation component of the Forest Tenure Administration System will be completed and operational in every forest district and region in British Columbia;

- The decision to issue more tree farm licences will require a greater planning effort;
- Resource planning will increasingly be used to actively coordinate timber, range and recreation resource management and the resource programs of other provincial agencies; and,
- Resolution of local resource development issues will require integrated resource planning and public consultation to respond to public concerns.

Inventory

Program description and goals

This program provides:

- Current statistics through periodic re-inventory and depletion updates;
- Forest-cover digital files with geo-referenced inventory data;
- Timber supply analysis to assist in determining the allowable annual cut of timber supply areas, and review of management and working plans for tree farm licences; and,
- Development and calibration of growth and yield models for the estimation and projection of forest stands for inventory reporting resource analysis.

The goals were:

- To analyse seven timber supply areas;
- To review five tree farm licence management and working plans;
- To digitize 1,100 forest-cover map sheets with associated overlays and statistics;
- To update 1,500 previously digitized map sheets for depletions;
- To re-inventory 500 map sheets;
- To calibrate a variable-density-yield prediction system for coastal and southern interior species;
- To establish, re-measure and/or purchase 800 permanent sample plots;
- To establish 70 stem (site) analysis plots;
- To ecologically assess 500 permanent-sample plots;
- To produce 400 area-volume and other statistical reports;
- To generate 20 timber supply area area-volume data files for timber supply analyses; and,
- To distribute 6,000 geographic-information-system digital-map-sheet data bases to forest regions, forest districts, and the private sector.

Client situation

The program's clients are resource managers and planners in forestry from the private and public sectors.

The existing forest resource inventory was developed over the past 25 years and statistics were produced by public sustained-yield-units to determine the allowable annual cut. Thus the sampling system provided average volumes, which are reliable for large forest units but not for individual stands of trees.

Refinements in the classification system — such as the use of site-index equations, adjustments for species composition, and realistic estimation of stand density and/or stocking — are needed to derive stand-specific volume estimates for the clients.

The provincial re-inventory of forest land within timber supply areas provides the detailed forest-cover information necessary to generate up-to-date forest cover statistics and map sheets.

Statistics are provided to managers and planners in the forest districts who require the inventory data for their programs.

Activities

During the year, these projects were accomplished:

- Analysis of two timber supply areas;
- Review of two tree farm licence management working plans;
- Digitizing of 1,778 forest-cover map sheets with associated overlays and statistics;
- Updating of 963 previously-digitized map sheets for depletions;
- Re-inventory of 469 map sheets;
- Calibration of a variable-density-yield prediction system for coastal and southern interior species;
- Establishment, re-measurement or purchase of 800 permanent sample plots;
- Establishment of 70 stem (site) analysis plots;
- Ecological assessment of 500 permanent sample plots;
- Production of 560 area-volume and other statistical reports;
- Generation of 12 timber supply area area-volume data files for timber supply analyses;

- Distribution of 6,469 geographic-information-system digital-map-sheet data bases to forest regions, forest districts, and the private sector; and,
- Re-inventory of forest cover on 469 map sheets in 10 timber supply areas.

Expenditures

Forecast expenditures were $13.6 million. Actual expenditures were $13.5 million. The major expenditures were $4.3 million for inventory maintenance and $3.2 million for map loading and digitizing (*Table H-1*).

Effect on clients

Up-to-date and detailed forest-cover information is needed in a geo-referenced format for provincial and local planning. In providing this information to clients, the program contributes directly to improved resource management and planning.

Forecast

The program will:

- Re-inventory each timber supply area and tree farm licence every 16 years;
- Update each forest-cover map sheet and corresponding descriptive statistics every two years;
- Maintain permanent sample plots for the development of growth-projection systems and the supply of realistic growth models for timber supply analysis;
- Convert all forest-cover map sheets into digital form by 1991;
- Initiate programs to geo-reference all growth and yield samples as well as projection applications to the biogeoclimatic ecological classification system; and,
- Implement area-volume, statistical reporting for timber supply areas on an annual basis.

Fire Suppression

Program description and goals

The program minimizes damage from wildfires on forest and range lands and the urban/wildland zone. It is closely linked to, and supported by, the forest protection program.

The program supplies regional helitack crews, rapattack services, district firetack crews, unit crews, air tankers, and medium helicopter services through fire-preparedness activities.

It also funds the direct costs of forest-fire control activities, such as the hiring of personnel and equipment, short-term aircraft, and the purchase of fire-fighting materials.

The goal is to limit annual area burned to 69 000 hectares and the volume of timber loss to 2.6 million cubic metres. This goal was achieved: area burned was 25 380 hectares and timber loss was about 1.8 million cubic metres.

Client situation

The primary clients are other ministry, provincial, and federal government programs. It also serves the forest industry and British Columbians by being principally responsible for forest fire control services.

Activities

Direct fire-fighting

Funds direct fire-line expenditures: fire-fighters' wages, equipment rentals, aircraft hire, supplies, standby and overtime, as well as site rehab ilitation.

Fire preparedness

Funds activities in preparation for a fire: training, communications, detection, equipment development, initial attack crews, unit crews, and aircraft availability.

Expenditures

Direct fire-fighting

Forecast expenditures were $22.5 million. Actual expenditures were $41.6 million. (*Table I-1*).

Fire suppression preparedness

Forecast expenditures were $27.5 million. Actual expenditures were $24.7 million. The major expenditure was $10.2 million for aircraft availability (*Table J-1*).

Effects on clients

The fire season was longer than normal with 3,520 fires although the area burned per fire was lower than average.

Heavy lightning storms resulted in more than the expected number of lightning-caused fires: 57.5 per cent of starts compared to a 10 year average of 48.3 per cent. Total area burned was 25 380 hectares. There were 41 fires which exceeded 100 hectares, the largest being 3 870 hectares. Nearly 90 per cent of all fires were put out by district-based firetack crews and timber loss was approximately 1.8 million cubic metres.

Forecasts

Regional initial-attack, rapattack, and other initial attack forces will remain unchanged, however, greater mobility of these key suppression forces will be carried out.

Specialized 'unit crews' will be expanded to work larger fires more efficiently.

Medium-lift helitankers/rappel helicopters will be contracted and strategically based throughout the province. This will ensure fast, initial-attack resources and reduce the logistic problems of transporting helitack and rapattack crews around the province.

Wildland/urban fires will continue to be a problem with ongoing work required to co-operatively prevent, reduce, and control fires originating or moving into residential areas.

Continued co-operation with other government agencies will be stressed. To enhance mutual-aid agreements with other provinces, ongoing changes in fire-line organizations and procedures will be required.

Forest Resource Development Agreement 1985 - 1990

Program description and goals

The Canada-B.C. Forest Resource Development Agreement is a joint initiative of Canadian and B.C. governments. It recognizes the importance of the forest industry to the province's social and economic well-being.

The *1984 Forest and Range Resource Analysis* indicated there were 738 000 hectares of backlog, not-satisfactorily-restocked lands on good and medium sites which were not contributing to forest growth. These lands are categorized as areas harvested, burned by wildfires, or destroyed by pests or other damage, before January 1, 1982.

In addition to these lands, there are many established juvenile stands which need intensive forest management to sustain or improve their growth and value.

The agreement's objectives are:

- To manage and reforest part of the backlog of not-satisfactorily-restocked lands;
- To intensively manage selected forest stands;
- To support forestry research by government and non-government organizations; and,
- To assist the forest industry through studies related to use, marketing and product development, technology transfer, and training.

A major portion of the agreement is implemented by the province through a cost-shared component where the federal government shares the cost on a 50-50 basis.

Also, two unilaterally-funded components are administered by Forestry Canada and the ministry.

This report contains the accomplishments under the cost-shared component and the ministry's unilaterally-funded component.

Client situation

Reforestation of the backlog of not-satisfactorily-restocked lands and incremental forest management of established young stands is important. Without it, the province's economic future will deteriorate:

- Unemployment will increase;
- Income generated by the forest industry will decrease;
- Resource revenues will drop; and,
- Opportunities to diversify the industry will lessen.

Silviculture contractors, the program's specific client group, were fully used during the year in many field activities. More than 90 per cent of the work under the agreement was carried out by private-sector contractors.

Activities

The agreement has three components:

- Backlog reforestation;
- Incremental forest management; and,
- Implementation, communications and evaluation.

Backlog reforestation

This component includes activities to restock the backlog of not-satisfactorily-restocked forest land caused by timber harvests, wildfires, and pest, and disease infestations. Activities include surveying, producing seedlings, preparing sites, planting, implementing projects, extension and demonstration of information, and research and development.

Table K-2 gives a detailed breakdown of regional accomplishments in these activities.

The accomplishments on Crown land in 1989-90, relative to goals, were:

Activity	Goals[1]	Accomplishments
	hectares	
Surveying	223 036	237 372
Site rehabilitation	24 655	23 276
Backlog planting	34 682	31 755
	thousands	
Seedlings planted[2]	37,766	39,240

1. Revised goals established by the Canada-B.C. Forest Resource Development Agreement management committee.
2. Number of seedlings planted, in thousands.

- About 237 000 hectares of backlog lands were surveyed for stocking, plantability, survival, free growing and stand maintenance (*Table K-2*). Survey information is used to develop plans for effective reforestation and stand-improvement projects, to initiate seedling production and to update records, inventory data and forest-cover maps — all used for annual reports, timber-supply analyses and allowable annual cut projections.
- Site rehabilitation was performed on over 23 000 hectares, about 1 300 hectares short of the goal. This is not expected to impact future planting goals, as fill-in planting and planting without site preparation are viable alternatives;
- 39 million trees were planted on about 32 000 hectares (*Table K-2*);
- The cost of producing the seeds and seedlings for planting on backlog lands was approximately $7.4 million;
- The backlog reforestation effort has increased the need to redefine and improve the efficiency of forest practices essential for reforestation. Forestry extension, demonstration and research and development is a sub-component of backlog reforestation. In 1989-90, about $4.1 million was spent on improved nursery practices, seedling storage, site preparation, reforestation practices and prescriptions as well as plantation growth and yield research. A portion of the money was spent on demonstration and transfer of information, techniques and standards for field foresters and client organizations. The ministry helped communicate research and development results.
- As of January 1990, the number of hectares of backlog not-satisfactorily-restocked land on good and medium sites had been reduced by 41 per cent from the 1984 total due to Forest Resource Development Agreement work in the past five years. Increased planting and silviculture surveys resulted in fewer areas being classed as backlog not-satisfactorily-restocked. Changes in the ecosystem classification and survey procedures as well as modifications in silviculture standards have resulted in less land being classed as backlog not-satisfactorily-restocked.

Incremental forest management

Activities include brushing, controlling pests, freeing older conifers from competition, spacing, fertilizing, extension demonstration, and research development.

See Table K-2 for a detailed breakdown of regional accomplishments in these activities.

Accomplishments on Crown land during 1989-90, relative to goals, were:

Activity	Goals[1]	Accomplishments
	hectares	
Brushing	6 415	10 961
Freeing older conifers from competition	2 695	1 656
Spacing[2]	17 431	17 837
Fertilizing	12 615	14 904
Other[3]		1 573

Notes:

1. Revised goals established by the Canada-B.C. Forest Resource Development Agreement management committee.
2. Includes spacing of young conifers and falling of diseased and damaged trees.
3. Includes pruning, mistletoe control and falling of snags and residual trees.

During 1989-90:

- Brushing treatment was performed to control competing vegetation in backlog stands;
- Pest control projects focused on major pests that injure young trees;
- Conifer release was performed by cutting vegetation that was overtopping or surrounding trees;
- Selected trees in immature stands were removed during spacing projects to reduce density in young stands, control stocking,

maximize growth, prevent stagnation and improve tree value;
- Fertilizing was used to correct nutrient shortfalls in forest soils and promote accelerated tree growth, resulting in increased volume per tree and a shorter period until harvest; and,
- The ministry, under the direct-funded part of the agreement, continued to support research on growth and yield effects of incremental silviculture treatments.

Implementation and communication

This component covers the activities required to ensure the agreement's terms and conditions are adhered to, good forestry is being practised, and the results of this work are communicated to the public.

During 1989-90, the program:

- Invested $4.9 million on developing, supervising, monitoring, and evaluating projects; and,
- Invested almost $300,000 on developing and producing general forestry information brochures and slide/tape shows, constructing and erecting signs, contracting professional public relations services, and renting or leasing facilities and equipment for presentations.

Expenditures

Forecast expenditures were $73.1 million. Actual expenditures were $65.6 million *(Table K-1)*.

Expenditures in 1989-90 were:

- $41.2 million under backlog reforestation (*Table K-1* gives details of costs by forest region);
- $19.5 million under the intensive forest management component; and,
- $4.9 million under the implementation, communication and evaluation component.

Effects on clients

A mid-term (September 30, 1987) assessment of the agreement states that areas already treated are estimated to yield at least 340 000 cubic metres of lumber annually. This represents about 1,235 jobs per year, or $44.2 million of the Gross Domestic Product annually.

Over the agreement's full term, the areas treated should produce more than the original projections of 600 000 cubic metres of lumber annually and will result in more than 500 full-time and 15,000 short-term jobs.

Since the program began in May 1985, these accomplishments have been recorded:

• Surveying	960 000 hectares
• Rehabilitating sites	110 000 hectares
• Planting	133 000 hectares
	(equivalent to 158 million trees)
• Brushing	34 000 hectares
• Freeing older conifers from competition	5 200 hectares
• Spacing young trees	65 000 hectares
• Fertilizing	51 000 hectares
• Generating jobs	971,000 person-days

These activities resulted in an increase in productive forest land and improved forest stand values.

The *1990 Summary of Backlog Not-Satisfactorily-Restocked Forest Land* states the amount of backlog not-satisfactorily-restocked land has been reduced to 437 000 hectares from the 1984 estimate of 738 000 hectares.

The reforestation of the backlog of denuded lands will add volume to the long-run sustained yield of forest land in the province.

With funding through the agreement, spacing, fertilizing, and other stand-tending practices will increase the potential yields of second-growth stands, bringing them to harvestable size earlier, and thus maintaining or increasing the allowable annual cut in the province.

This will result in more jobs and more income generated in the province's harvesting, manufacturing, and service industries. In addition, there will be more resource revenues for the province.

Forecasts

The majority of incremental silviculture activities funded under the agreement ended March 30, 1990.

The province is negotiating with the federal government for an extension of the program.

A new agreement would help to further increase the value of existing stands to the benefit of British Columbia and Canada.

Forest Stand Management Fund

Program description and goals

The Forest Stand Management Fund was established as an account in the consolidated revenue fund to provide continuing appropriation of money for:

- Silviculture and other management and enhancement of forests, forest lands and range lands; and,
- Employment and training opportunities in carrying out these activities.

The main activities carried out under the fund include:

- Silviculture;
- Recreation;
- Protection;
- Range;
- Engineering; and,
- Training.

Client situation

The program's general client group — silviculture contractors and people on the provincial social assistance program — were fully involved during the year in the delivery of many field activities under the program.

Activities

The fund was used as a mechanism to fund the Community Forests and Forestry Enhancement Programs.

Under the Community Forests Program, municipalities or regional districts are given the opportunity to improve the forests in their vicinity as well as provide employment opportunities. The program provided 75 per cent of the funding while municipalities and regional districts contributed 25 per cent.

The Forest Service and municipalities or regional districts were jointly responsible for identification of projects and administration of the program.

Under the Forestry Enhancement Program, the Ministry of Social Services and Housing provided funding to the Forest Stand Management Fund. Under the Forestry Enhancement Program, provincial social assistance recipients were employed in a variety of silviculture activities.

Through the Community Forests Program and the Forestry Enhancement Program, these accomplishments were achieved:

Activity	Accomplishments
Silviculture[1]:	
Surveying	2 297 hectares
Planting	17 hectares
Brushing	828 hectares
Freeing older conifers from competition	319 hectares
Spacing	2 596 hectares
Fertilizing	2 hectares
Rehabilitating sites	13 hectares
Other[2]	863 hectares
Seedlings planted	9,000
Recreation:	
Maintaining and constructing sites	29 sites
Construction sites	5 sites
Maintaining trails	11 kilometres
Constructing trails	32 kilometres
Cutting firewood	33 cords
Protection:	
Abating hazards	50 hectares
Range:	
Fence construction	1 kilometre
Maintaining fences	113 kilometres
Trail work	20 kilometres
Seeding	15 hectares
Engineering:	
Maintaining roadsides	172 kilometres
Roadside brushing	83 kilometres
Slashing right of ways	9 kilometres

1. Table L-2 outlines the silviculture accomplishments by forest region.
2. Includes pruning, controlling mistletoe and falling snags and residual trees.

Persons employed under this program also received training in survival first aid, accident prevention, power-saw operation and other forestry-related training.

During 1989-90, the ministry was responsible for:

- Identifying and laying out treatment areas; and,
- Inspecting and supervising work quality.

Expenditures

Forecast expenditures were $5.0 million. Actual expenditures for the Community Forestry Program (not including the minimum 25 per cent contribution from local governments) were $4.5 million *(Table L-1)*. In addition, the Ministry of Social Services and Housing provided $2.7 million for the Forest Enhancement Program.

Effects on clients

In 1989-90, about 23,000 person-days of work were generated by the fund.

Forecasts

Next year, the ministry will continue to use the fund to:

- Carry out silviculture and other activities to manage and enhance forest and range lands; and,
- Provide forestry jobs and training for persons on the provincial social assistance program.

Small Business Forest Enterprise Program

Program description and goals

Through this program, Crown timber is sold to individuals and firms that are registered or qualified to register under the program.

The program has three main goals:

- New opportunities: Through timber sales, the program provides opportunities for individuals and firms to enter the forest industry and establish new businesses.
- Diversification and jobs: Timber is sold to promote and stimulate the production of specialty and higher valued forest products. Sales to encourage value-added uses of timber are expected to lead to further diversification of the forest industry and increased regional jobs.
- Competition and profit: Timber marketing through a competitive process ensures that the most efficient firms are awarded timber sales and the province receives a fair rate of return for the forest resource.

Client situation

The program serves two main client groups. The primary clients are those individuals and firms registered in the program and competing for advertised timber sales. This group consists of loggers, sawmill owners, remanufacturers and specialty product manufacturers.

Participants are registered in one of two categories: Category 1, for those who do not own or lease a timber-processing facility; and Category 2, for those who own or lease a timber-processing facility.

There were 2,667 registrants on March 31, 1990, (*Table M-3*) and approximately 82 per cent of the individuals and firms were registered in Category 1.

The second group of clients are the contractors who construct roads, re-forest land, measure and protect the timber resource and assist in the planning of forest management activities.

Field operations for virtually all ministry activities were carried out by private-sector contractors.

Activities

Regulations

The *Advertising, Deposits and Disposition Regulation*, has been changed to allow the advertisement of more sales, as well as reducing the deposit required for many timber sales sold under the Small Business Forest Enterprise Program.

For timber sales of less than 2,000 cubic metres or timber that must be removed quickly (i.e. timber attacked by insects , disease, fire or would otherwise be lost), the advertising period has been shortened to five days in a local newspaper. This change will allow the timber to be sold competitively and will result in more advertised sales.

The initial deposit, which must be included for sales, has been substantially reduced. By reducing the amount of money which must be submitted in the tender and the amount of the total deposit which must be submitted by the successful applicant, the cost to a small business forest enterprise will be reduced.

In addition, this regulation provides for penalties to be levied for failing or refusing to enter into an agreement or for failing or refusing to comply with the conditions of a licence.

Bid proposal sales

Bid proposal sales are designed to encourage further manufacturing of forest products. Persons interested in competing for a sale must submit a business proposal including a commitment to produce remanufactured or specialty forest products such as remanufactured lumber, doors, windows and furniture.

Bid proposal sales are awarded to the firm which submits the best proposal.

Proposals are evaluated to determine the value-added for the applicant's manufacturing facility. The sale is awarded to the firm with the best combination of value-added and bonus bid.

There has been strong interest in these bid proposal sales. For the fiscal year, 38 sales

with a total volume of 5.1 million cubic metres were awarded to a variety of specialty and remanufacturing firms proposing capital investments of over $55 million. This proposed investment will result in an estimated 885 new manufacturing jobs and help maintain 890 existing jobs.

Volume sold

A total of 12.6 million cubic metres of timber was sold during 1989-90 (*Table M-3*) while at the time of sale, the timber was valued at more than $199 million.

Work to support timber sales

Most of the work necessary to support the program's timber sales was conducted by contractors. Some of the accomplishments were:

Road construction	753	kilometres
Timber cruising	13.3	million cubic metres

Silviculture

Forest land denuded after January 1, 1988, was restocked under the program. Activities included surveying, site preparation, planting and brushing.

Accomplishments on Crown land were:

Activity	Goals[1]	Accomplishments
	----------hectares----------	
Surveying	25 724	11 549
Preparing sites	20 090	19 071
Planting	4 363	2 979
Brushing[2]	1 668	176
Spacing[3]	200	542
Other[4]		1 677
	----------thousands ----------	
Seedlings planted	5,846	3,779

1. Regional revised targets.
2. Small Business Forest Enterprise Account funds only
3. Includes spacing of young conifers and falling of diseased or damaged trees.
4. Includes pruning, controlling mistletoe and falling snags and residue trees.

Table M-4 outlines these accomplishments by forest region while Table P-8 shows average costs of basic silviculture treatments.

Silviculture audit

Silviculture audits are required to be conducted on a portion of the areas under the Small Business Forest Enterprise Program areas that have been declared as free-growing in any one year.

In 1989-90, a total of 72 licences covering 2 111 hectares of ministry-responsible areas were audited. Table M-5 summarizes the audits conducted in each region.

All areas were determined as likely to meet free-growing status within the time specified in the pre-harvest silviculture prescription, with the exception of three areas in the Prince Rupert region. Measures to meet obligations have been implemented.

Program management

The program is managed on a self-financing basis.

Under the program, the ministry assumes responsibility for the construction of forest roads and bridges, silviculture and other forest management requirements that are incidental to operations that yield small business revenue.

The Small Business Forest Enterprise Account receives all revenues and is the source of funding for all program expenditures.

Revenue in excess of funds required for current expenditures and future silviculture obligations is returned on an annual basis to the province's general revenue fund.

An annual business plan outlines the program's revenue goals and expenditure limits. Program performance is also monitored through quarterly reports submitted to Treasury Board.

Expenditures

The forecast expenditures for the year were $62.9 million while actual expenditures were $57.7 million *(Table M-1)*.

The expenditures were:

Administration	$ 15.3 million
Harvesting	
Sales	$ 7.5 million
Roads	$ 23.7 million
Silviculture	$ 10.3 million
Protection	$ 0.9 million

The major expenditure was for the construction of roads to provide access to future timber sales.

Silviculture expenditures were relatively low but will increase substantially in future years. The Small Business Forest Enterprise Account pays for reforestation of land harvested after January 1, 1988, and as land becomes ready for reforestation, expenditures will increase.

Revenues

Revenues for 1989-90 totalled $147.3 million *(Table 1)*, based on a total timber volume billed of 9.1 million cubic metres.

A breakdown of revenues is as follows:

Stumpage billed	$146.0 million
Accrued billings	($1.5) million
Annual fees and billings	$2.8 million

Table M-2 details stumpage billed.

Revenues exceeded expenditures by $89.6 million. After taking into account the opening balance of $31.6 million and reserving funds for silvicultural liability of $59.9 million, the Small Business Forest Enterprise Account returned $61.3 million to the government's Consolidated Revenue Fund.

Effects on clients

There were increased opportunities for registrants to compete for timber as well as more work for contractors due to the expansion of the program. The reduced deposit size was well received as it enables more small business enterprises to compete for sales.

The demand for all sales remained strong during the year. Bid proposal sales also received a very good response from the industry, as evidenced by the high number of applicants received for each bid proposal sale.

The program expansion has also increased the amount of contract work done by firms specializing in road building, cruising and layout work.

In silviculture alone, about 28,000 person-days of work have been generated.

Forecasts

Demand for timber offered for sale is expected to remain strong.

Expenditures in the next few years are expected to increase, particularly in silviculture, as the land base from timber sales awarded since January 1, 1988, becomes ready for reforestation.

In the next year, the number of bid proposal sales will continue to increase, providing more opportunities for small business.

South Moresby Forest Replacement Account

Program description and goals

Following the joint agreement between the federal government and province of British Columbia to establish the South Moresby National Park in 1988, the South Moresby Forest Replacement Account was created to offset economic and employment losses in coastal British Columbia.

The main goal of the account is to enhance timber production and improve forest yields, thereby creating jobs. As a result of the park's creation in the South Moresby region of the Queen Charlotte Islands, an estimated 147 000 hectares of land, previously managed for forest production, is no longer available for this purpose.

Canada and British Columbia have each deposited $12 million into the South Moresby Forest Replacement Account, which will now be managed by the provincial government.

Although the account expires on March 31, 1996, it can be extended if funds remain in the account. At least half of the money will be spent on projects in the Queen Charlotte Islands while the remainder will be available for projects in the coastal forests of British Columbia.

Projects can be undertaken on any productive lands which are committed to long-term management, including provincial timber supply areas and tree-farm licences in the Queen Charlotte Islands.

Projects can also be undertaken on private, native, municipal and federal lands.

To maximize the benefits of the program, the account is intended to supplement rather than replace on-going forestry programs. Priority will also be given to projects and treatments that provide the best combination of increased timber production and employment.

This report contains the accomplishments under this agreement in 1989-90.

Client situation

The account will not only help offset the reduction in timber supply resulting from the creation of the South Moresby National Park, it will also help restore employment in the forest sector, at least until the full economic benefits of the park are realized.

Without these activities, the economic future for British Columbians will deteriorate: unemployment will increase, forest industry income will decrease, resource revenues will drop and diversification opportunities will lessen.

The program's specific client group, silviculture contractors, were used to the fullest during the year. Over 90 per cent of the work under the agreement was carried out by private sector contractors.

Activities

Only enhanced forest management projects necessary to on-going Forestry Canada, Ministry of Forests and ministry licensee programs, will be eligible for funding under the South Moresby Forest Replacement Account.

All projects are according to Forest Service standards. Activities include special inventories, surveys, production of seedlings, site preparation and rehabilitation, planting, brushing, spacing, fertilization, pest management, implementation of projects, research, extension and demonstration of information.

Table N-2 has a detailed breakdown of regional accomplishments in these activities.

The accomplishments on Crown lands in 1989-90, relative to goals, were:

Activity	Goals[1]	Accomplishments
	----------hectares----------	
Surveys	26 800	1 602
Site rehabilitation	100	
Brushing	900	
Spacing	1 500	1 710
Fertilizing	1 000	

1. Goals as published in the five-year Forest and Range Resource Program 1989-1994.

During 1989-90:

- About 1 600 hectares were surveyed for stocking, plantability, free growing and stand maintenance. Survey information is used to develop plans for effective reforestation and stand-improvement projects, to initiate seedling-production requests and to update records, inventory, data bases and forest-cover maps — all used for annual reports, timber supply analyses and allowable-cut projections;
- Approximately 1 700 hectares of selected trees in immature stands were removed during spacing projects to reduce the density in young stands, control stocking, maximize growth, prevent stagnation and improve tree value; and,
- The ministry, under the direct-funded component of the agreement, continued funding support for research on the growth and yield effects of incremental silviculture treatments.

Expenditures

The forecast expenditures were $ 3.4 million; actual expenditures were $ 2.6 million *(Table N-1)*. Expenditures in 1989-90 were:

- $2.2 million for intensive silviculture *(Table N-1)* gives details of costs by forest region;
- $.3 million for research and demonstration; and,
- $.1 million for special inventories and updating of forest inventories.

Effects on clients

With funding from the agreement, spacing, fertilization and other stand-tending practices will increase the potential yields of second-growth stands, bringing them to an earlier harvestable size and maintaining the allowable cut.

This will also result in employment and income being generated from the harvest, manufacture and service industries. In addition, maintained resource revenues will be available to the province.

Forecasts

The incremental silviculture activities funded under the agreement will continue to be an important part of silviculture activities on Crown land in 1990-91.

Silviculture - private sector (major licensees)

Program description and goals

The program involves restocking areas denuded by the private sector on major licences harvested after October 1, 1987, and from royalty-bearing timber licences.

Silviculture treatments are completely implemented and funded by the private sector.

The *Silviculture Regulation* requires basic silviculture be carried out on all major licence areas. Treatments include:

- Restocking of denuded areas by planting, seeding or natural regeneration;
- Site preparation to promote natural regeneration and planting;
- Brushing on some stands to ensure free growing and unimpeded seedling growth;
- Spacing of interior drybelt Douglas-fir and lodgepole pine stands exceeding allowable densities; and,
- Monitoring of growth and survival is performed on an operational basis by surveying lands.

Client situation

The program's general client group — the province's private sector — and its specific clients — the silviculture contractors — were used to the fullest extent during the year in the delivery of the majority of field activities under the program.

Activities

Basic silviculture

This component involves restocking forest land denuded by the private sector from major licences harvested after October 1, 1987 and from royalty-bearing timber licences. Activities include surveying, preparing sites, planting, brushing, spacing, and cone collections.

Accomplishments on Crown land were:

Activity	Accomplishments
	------hectares -----
Surveys	25 093
Preparing sites	85 796
Planting	44 333
Brushing	10 272
Fertilizing	646
Spacing[1]	436
Other[2]	20
	------thousands ----
Seedlings planted	50, 452

1. Includes spacing of young conifers and falling of diseased and damaged trees.
2. Includes pruning, controlling mistletoe, and falling snags and residual trees.

Table O-2 outlines these accomplishments by forest region while Table P-8 shows average costs of basic silviculture treatments.

During 1989-90, the private sector was responsible for:

- Surveying approximately 25 000 hectares of recently denuded lands for stocking, plantability and stand tending. The survey information is used to develop reforestation and stand improvement plans, initiate seedling production requests and to update the Major Licence Information System, inventory data bases and forest-cover maps — all used for annual reports, timber supply analyses and allowable cut projection;
- Preparing sites for natural regeneration and planting on 86 000 hectares;
- Planting approximately 50 million trees on 44 000 hectares of Crown land;
- Brushing treatments to control undesirable vegetation in young stands on 10 000 hectares; and,
- Fertilizing on about 600 hectares of young stands.

Expenditures

The private sector spent $59.3 million on basic and incremental silviculture in fiscal year 1989-90.

Effects on clients

In 1989-90, about 207,000 person-days of silviculture employment were generated by activities funded by the private sector.

Forecasts

The private sector will continue to be responsible for carrying out basic silviculture on areas harvested under major licences.

Silviculture activities funded by the private sector will continue to increase. In the near future, the majority of silvicultural activities in B.C. will be funded and implemented by the private sector.

Silviculture audit

The Forest Act, Section 150 (1) authorizes a silviculture audit on areas harvested under a licence agreement. *The Ministry of Forests Act*, Section 10 (2) also requires a statement of basic silviculture audit be reported in the annual report.

Silviculture audits are required on a portion of the areas that are under major licences.

The regional or district manager may carry out audits at anytime until free-growing status is achieved.

In 1989-90, a total of 122 licenses covering a total of 13 745 hectares of licensee-responsible areas were audited. Table O-3 contains a summary of audits by region.

All areas were determined as likely to meet free-growing status within the time specified in the pre-harvest silviculture prescription, with the following exception:

- Where areas appeared unlikely to meet free-growing status, licensees were required to prepare a pre-harvest silviculture prescription amendment to ensure obligations will be met.

Silviculture activity summary

Silviculture involves restocking denuded forest lands and improving the value and productivity of forest stands through treatments, as follows:

- Harvested areas and lands denuded by wildfires, pests and other damage (referred to as denuded lands), are restocked artificially by planting, seeding and natural regeneration;
- Site preparation is used to promote natural restocking and to facilitate planting;
- Brushing is performed on some stands to ensure unimpeded seedling growth;
- Spacing, fertilizing and conifer release are undertaken to improve the value and productivity of selected forest stands; and,
- Monitoring of growth and survival is performed on an operational basis by surveying lands.

The program on Crown land is funded by various sources, including:

- The provincial funding for Ministry Vote (*Table D-1*);
- The ministry fire and pests sub-program (*Table P-11*);
- The Canada-B.C. Forest Resource Development Agreement (*Table K-1*);
- The Forest Stand Management Fund (*Table L-1*);
- The Small Business Forest Enterprise Program (*Table M-1*);
- The South Moresby Replacement Account (*Table N-1*);
- The private sector (*Table O-2*); and,
- Federal job-creation programs and the provincial corrections program (*Table P-1*).

Each of these funding programs is detailed in their own sections in this report.

This section summarizes the total silviculture accomplishments in the province in 1989-90.

Using all funding sources in 1989-90, the ministry and licensees were responsible for:

- Surveying more than 656 000 hectares to identify and plan for silviculture treatments (*Table P-2*);
- Preparing sites (*Table P-3*): 148 000 hectares; and,
- Planting on Crown and private lands (*Table P-4 and P-5*):

Planting on Crown and private forest lands was composed of the following:

Land status	Millions of trees	Hectares planted
Crown land	208.6	172 100
Private land	1.8	2 200
Totals	210.4	174 300

- About 82 per cent of the planting was on areas recently denuded (basic silviculture); the rest was on areas denuded before 1982 (incremental silviculture);
- A variety of species were planted on Crown land (*Table P-6*) — predominant were interior spruce and lodgepole pine;
- Brushing (*Table P-7*) was done on almost 60 000 hectares of Crown land; brushing has increased over the last 10 years and more increases are anticipated; ministry studies indicate about 80 000 hectares need to be treated annually to protect initial silviculture investments and to ensure unhindered tree growth;
- Over 2 000 hectares of conifer release, 30 000 hectares of spacing and 16 000 hectares of fertilizing (*Table P-2*) to improve the value and productivity of forest lands;
- Site rehabilitation to bring 23 000 hectares of land back into production (*Table P-2*); and,
- Pruning, mistletoe control, falling of snags and residual trees as well as sanitation treatments and seed-tree elimination on 9 000 hectares (*Table P-2*).

New silviculture regulation

On April 1, 1988, the *Silviculture Regulation* came into effect. This regulation outlines the obligations of major licence holders to carry out basic silviculture according to a pre-harvest silviculture prescription.

Increasing silviculture accomplishments

Graphs 1-8 illustrate the silviculture accomplishments from 1980 to 1989-90. Most silvicultural activities have tripled in the past 10 years.

Silviculture surveys, preparation of sites, planting, and brushing will continue to expand to meet the ministry's basic silviculture obligations and the goal to restock, by year 2000, the remaining good and medium sites that were denuded before 1982 and are not-satisfactorily-restocked.

Because of the need to properly plan and monitor silviculture activities, silviculture survey work has tripled in the past 10 years on Crown land *(Graph 1)*.

Annual preparation of sites increased from 73 000 hectares in 1980 to more than 147 000 hectares in 1989-90 *(Graph 2)*.

In 1980-81, about 63 000 hectares of Crown land were planted. In 1989-90, more than 172 000 hectares were planted *(Graph 3)*. A large proportion of the total planting program was funded by the Canada-British Columbia Forest Resource Development Agreement.

Brushing activities increased from 3 000 hectares in 1980 to almost 60 000 in 1989-90. Brushing treatments will continue to increase, particularly due to requirements in the *Silviculture Regulation* for the ministry and licensees to establish healthy, free-growing forests *(Graph 4)*.

The spacing of young conifers and the falling of diseased and damaged trees have been primarily funded through the Canada-British Columbia Forest Resource Development Agreement in the past few years. However, the Forest Stand Management Fund, the federal job-creation programs, and the provincial corrections program have also provided funds *(Graph 5)*.

In the future, there will be more spacing of young conifers — dry belt Douglas-fir and lodgepole pine — as part of basic silviculture.

Through the Forest Resource Development Agreement, the fertilization program was reinstated after a three-year absence. In 1989-90, about 16 000 hectares of land were fertilized *(Graph 6)*.

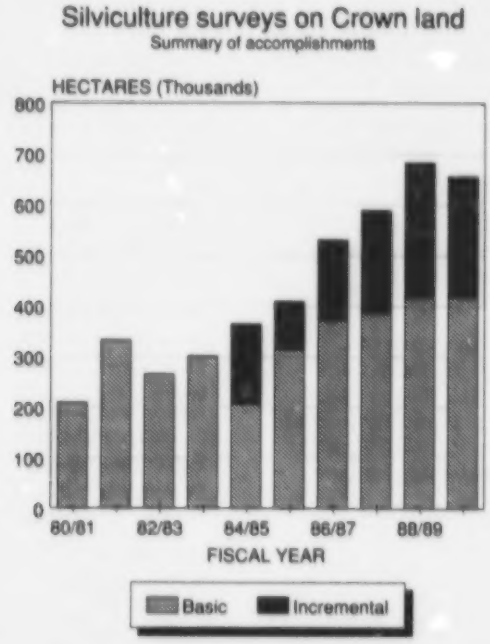
Site rehabilitation has increased steadily over the past 10 years. The Forest Resource Development Agreement has funded the work for the past five years *(Graph 7)*.

Increased Forest Resource Development Agreement funding has been used for conifer release and the reduction of competition from brush in older stands *(Graph 8)*.

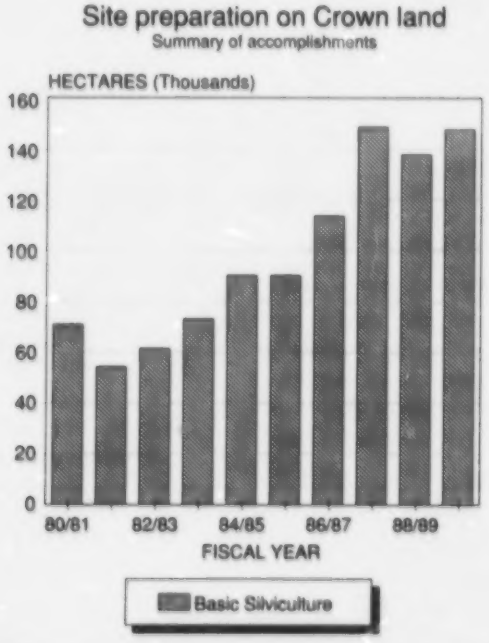
Planting began in British Columbia in 1930. It took 44 years to plant a half a billion trees. By 1981, the province had planted one billion trees. In 1989, the province planted its two-billionth seedling *(Graph A)*.

Until 1974, the majority of tree planting was on the B.C. coast. From 1974 until 1989-90, the majority of planting has been in the B.C. interior *(Graph B)*.

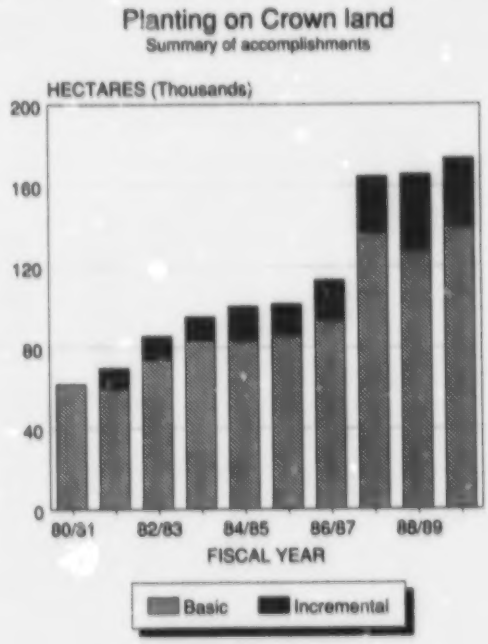
Graph 1 —Silviculture surveying on Crown land: tripled in the last 10 years to meet the need for proper planning and monitoring of silvicultural activities.



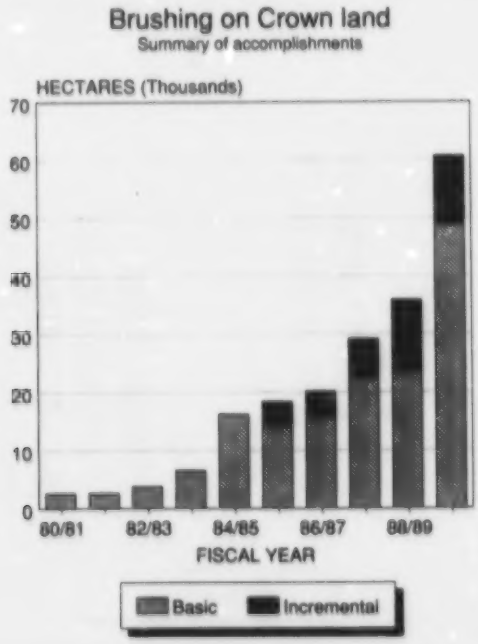
Graph 2:—Preparing sites on Crown land: increased from 73 000 hectares in 1980-81 to more than 147 000 hectares in 1989-90.



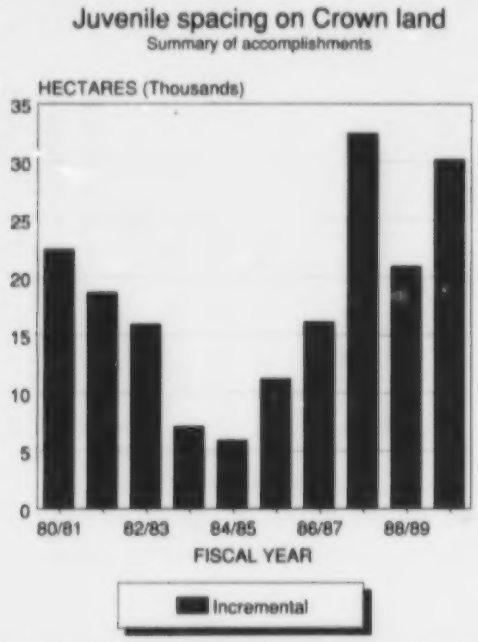
Graph 3 — Planting on Crown land: increased from 63 000 hectares in 1980-81 to 172 000 in 1989-90 — a large portion of this activity is funded by the Canada-B.C. Forest Resource Development Agreement.



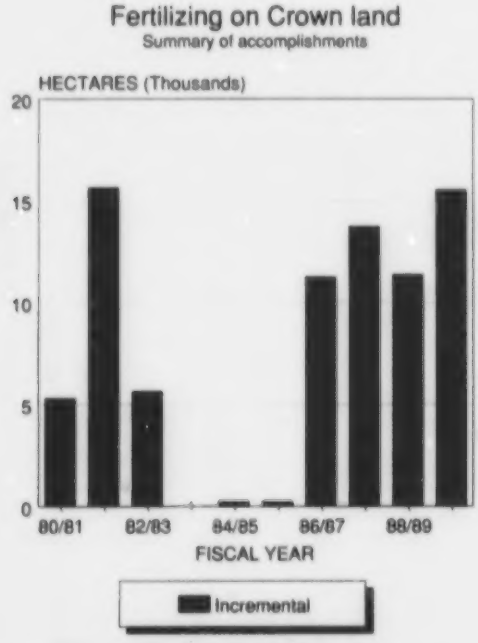
Graph 4 —Brushing on Crown land: increased from 3 000 hectares in 1980-81 to 60 000 hectares in 1989-90 — this treatment will continue to increase because of the requirements in the *Silviculture Regulation* for ministry and licensees to establish healthy, free-growing forests.



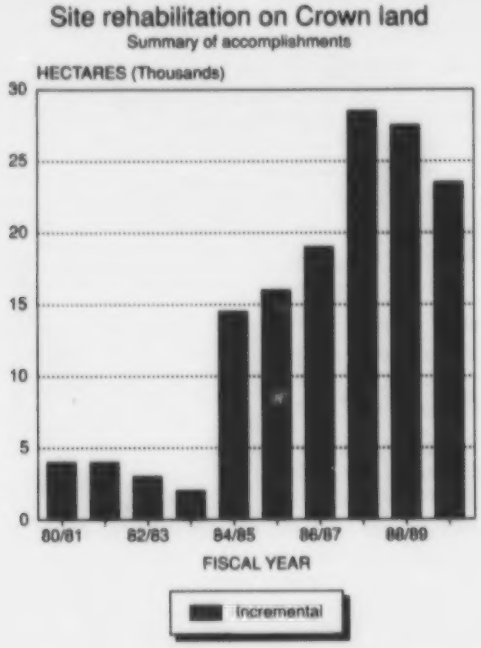
Graph 5 — Spacing of young conifers on Crown land: the spacing of young conifers and the falling of diseased and damaged trees are funded by the Canada-B.C. Forest Resource Development Agreement, the Forest Stand Management Fund, the Canada Job Strategy program, and the provincial Corrections Program. In the future, more spacing of young conifers will be carried out in the dry belt Douglas-fir and lodgepole pine stands as part of basic silviculture.



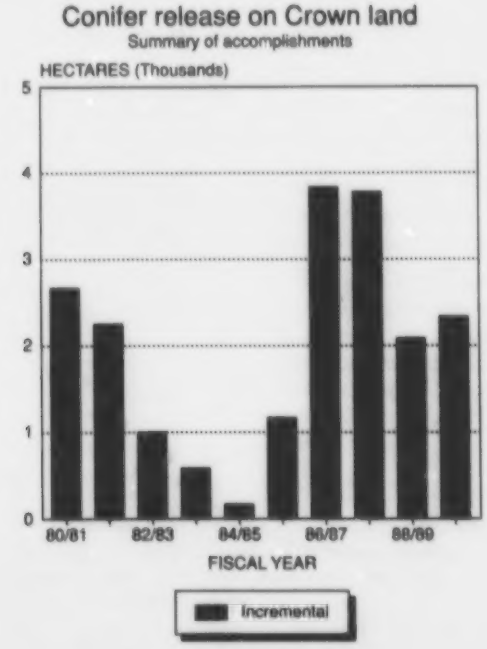
Graph 6 —Fertilizing on Crown land: will be maintained at 11 000 hectares per year over the next few years.



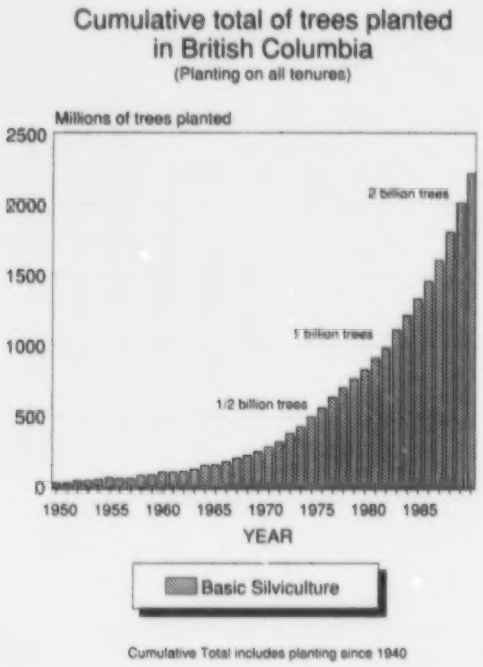
Graph 7 — Rehabilitating sites on Crown land: steadily increased over the past 10 years — the Canada-B.C. Forest Resource Development Agreement has funded this activity for the past five years.



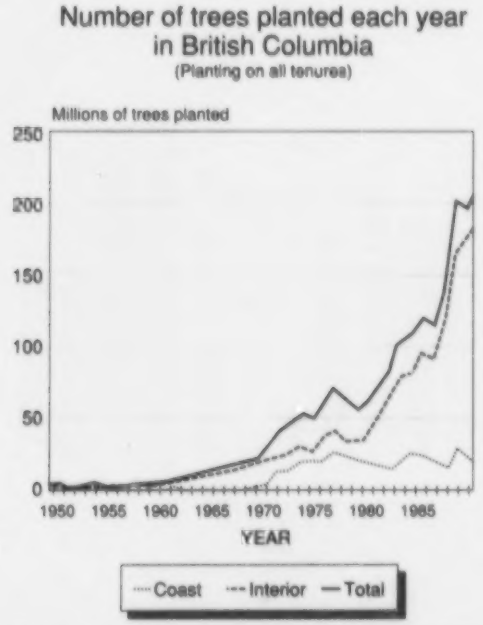
Graph 8 — Freeing older conifers on Crown land from competition: more funds have been spent, under the Canada-B.C. Forest Resource Development Agreement, to reduce brush competition on older stands.



Graph A — Cumulative total of trees planted — planting on all tenures: planting began in B.C. in 1930. It took 44 years to plant half a billion trees. By 1981, one billion trees were planted. In 1989, the province planted its second billion tree.



Graph B — Number of trees planted each year in B.C.: until 1974, the majority of tree planting was on the coast. From 1974 to 1989-90, most of the planting has been in the interior.



Expenditures

Provincial silviculture expenditures on Crown land for 1989-90 by funding source are:

Funding Source	Expenditures[1]
	------'000 ------
Ministry Vote	$ 134,667
Forest Resource Development Agreement	65,617
Forest Stand Management Fund	4,515
Small Business Forest Enterprise Account	10,292
South Moresby Forest Replacement Account	2,201
Subtotal	$ 217,292
Other [2]	1,544
Private sector	59,300
Total expenditures	$ 278,136

1. Excludes non-silvicultural expenditures.
2. Other funding sources represent the values of silvicultural accomplishments by federal job creation programs and the Joint Job Creation Program.

Effects on clients

In 1989-90, silviculture work on Crown land was generated by the following programs:

	Person-days
• Ministry vote for silviculture operations	473,000
• Basic silviculture funded by the Small Business Forest Enterprise Account	28,000
• Basic silviculture funded by the private sector	207,000
• Incremental silviculture funded by the Forest Stand Management Fund	23,000
• The Canada-B.C. Forest Resource Development Agreement	263,000
• The ministry fire and pest sub-program	900
• The South Moresby Forest Replacement Account	7,000
• Other sources	6,000
Silviculture programs within all funding sources	1,007,900

Forecasts

The total amount of silviculture activity will continue to expand over the next few years.

In the future, the private sector will be responsible for an increasing portion of provincial silviculture activities. The use of audits to monitor licensee's operations will require a greater amount of effort from Forest Service staff, contractors and consultants.

The ministry is urging the renewal of the Canada-B.C. Forest Resource Development Agreement.

The 1988-89 Ministry of Forests Annual Report presented the baseline numbers for reports detailing the net change in the not-satisfactorily-restocked lands each year.

Table P-12 details changes in not-satisfactorily-restocked lands by obligation category. In 1989-90, there was a 114 000 hectare decrease in not-satisfactorily-restocked lands on managed forest lands in the province. The largest decline was in Forest Resource Development Agreement and ministry-funded programs, due in large part to aggressive silviculture programs in these areas and the absence of timber harvesting.

The 1988-89 Annual Report detailed the base-line numbers of not-satisfactorily-restocked areas on managed forest lands. This report details the changes in not-satisfactorily-restocked lands over one year.

Timber harvesting caused an increase in the not-satisfactorily-restocked lands in the Small Business Forest Enterprise and private sector programs. Planting and natural regeneration of these areas will be undertaken within three to seven years.

The Small Business Forest Enterprise and major licensees silviculture programs will increase in the next few years. The amount of new plantations and natural regeneration under these programs will meet or exceed the amount of not-satisfactorily-restocked lands being created.

Silviculture audit

The Forest Act, Section 150 (1) authorizes a silviculture audit on areas harvested under a licence agreement. *The Ministry of Forests Act*, Section 10 (2) also requires a statement of basic silviculture audits be reported in the annual report.

Silviculture audits are required on at least five per cent of the major licensees and Small Business Forest Enterprise areas that have been declared free-growing in any one year.

The regional or district manager may carry out audits at times other than free-growing.

In 1989-90, a total of 194 licences covering a total of 15 856 hectares of ministry and licensee-responsible areas were audited. *Tables M-5* and *O-3* contain a summary of audits by region.

III. Summary Financial and Statistical Tables

Note: All financial data for 1989-90 contained in Section III is based on an accrual accounting system and is unaudited.

Note: Expenditures include some amounts for non-timber purposes.

Table 1: Revenue in 1989-90, by category and by region

Category	Cariboo	Kamloops	Nelson	Prince George	Prince Rupert	Vancouver	Victoria	Totals
				'000				
Stumpage	$ 44,087	$ 38,494	$ 29,573	$ 133,572	$ 36,013	$ 153,096	-	$ 434,835
Rents and fees	1,830	2,074	1,543	3,233	1,332	6,393	$ 609	17,014
Small Business Forest Enterprise	13,835	11,044	10,090	36,724	31,205	44,394	-	147,292
Royalties	-	308	331	206	922	29,769	-	31,536
Export fees	-	48	11	-	2,825	7,795	-	10,679
Scaling fees	179	279	213	414	228	1,410	-	2,723
Range fees	586	580	139	223	48	3	-	1,579
Interest	175	463	420	1,184	234	1,520	54	4,050
Miscellaneous	82	(93)	56	197	46	156	1,439	1,883
Totals	$ 60,774	$ 53,197	$ 42,376	$ 175,753	$ 72,853	$ 244,536	$ 2,102	$ 651,591

Table 2: Expenditure and full-time equivalents (FTEs) in 1989-90, by source of funds

Source of funds	Expenditure		Full-time equivalents[1]	
	Forecast[2]	Actual	Forecast	Actual
	'000		FTEs	
VOTE 27:				
A. Minister's Office	$327	$260	6.00	5.39
VOTE 28: Ministry Operations				
B. Management Services	98,686	97,579	1,038.00	1,042.72
C. Harvesting	52,610	50,895	897.00	838.31
D. Silviculture	151,805	134,667	670.00 [3]	627.40
E. Research	11,382	11,306	168.00	181.27
F. Forest Protection	18,898	17,284	280.00	269.90
G. Integrated Resource Management	16,159	15,980	183.00	175.13
H. Inventory	13,582	13,496	138.00	135.10
VOTE 29: Fire Suppression				
I. Direct Fire Fighting	22,534	41,552	-	-
J. Fire Suppression Preparedness	27,466	24,681	26.00	60.44
VOTE 30: Forest Resource				
K. Development Agreement (FRDA)	73,144	65,617	-	-
Totals (voted)	$486,593	$473,317	3,406.00[4]	3,335.66
Special Accounts (Statutory):				
L. Forest Stand Management Fund	5,000	4,515	-	-
M. Small Business Forest Enterprise	62,900	57,692	-	-
N. South Moresby Implementation				
Replacement	3,430	2,632	-	-
Compensation	32,924	265	-	-
Totals (Ministry)	$590,847	$538,421	3,406.00	3,335.66

Notes:

1. The concept of full-time equivalent (FTE) is based upon the normal working hours of one full-time employee for a one-year period (1,827 hours) and is used to account for all personnel on a similar basis.
2. Amounts shown reflect the final allocation for the year and include all transfers approved by Treasury Board and the ministry's executive during the year.
3. Reflects 621 FTEs for Silviculture and 49 FTEs for Forest Resource Development Agreement.
4. Reflects transfer of one FTE to the Ministry of Crown Lands.

Table 3: Expenditures in 1989-90, by category and by region

Category	Cariboo	Kamloops	Nelson	Prince George	Prince Rupert	Vancouver	Victoria	Totals
				'000				
Wages and salaries[1]	$13,342	$16,587	$15,909	$18,705	$14,138	$23,700	$41,627	$144,008
Professional services	20,156	27,351	23,694	50,598	31,079	33,109	37,402	223,389
Other Expenses[2]	8,063	11,497	15,447	17,751	12,362	14,216	91,688	171,024
Totals	$41,561	$55,435	$55,050	$87,054	$57,579	$71,025	$170,717	$538,421

Notes:

1. Includes $22.791 million in employee benefits.
2. Includes $18.201 million paid to the B.C. Buildings Corporation for occupancy charges incurred throughout the province.

Table 4: Productive forest land[1] in 1989-90 in timber supply areas and tree farm licences, by region

Region	Mature timber[3]	Immature timber[3]	Not stocked[2]	Totals
		'000 hectares		
Cariboo	3 565	2 217	157	5 939
Kamloops	2 435	1 781	228	4 444
Nelson	1 322	1 896	236	3 454
Prince George	9 562	5 748	2 112	17 422
Prince Rupert	6 389	2 097	907	9 393
Vancouver	3 293	1 456	196	4 945
Totals	26 566	15 195	3 836	45 597

Notes:

1. Source: 1989-90 Inventory Branch reports. Includes only productive forest land timber quality, accessibility and environmental sensitivity. Excludes:
   - Crown forest land in timber licences;
   - all private land;
   - all federal land;
   - provincial parks and miscellaneous reserves; and,
   - non-productive and non-forest lands.

   The total area of the province is 94.8 million hectares.
2. Not stocked productive forest land. Includes not-satisfactorily-restocked areas on which forest stands have been disturbed by harvesting, wildfire or other causes and have not been restocked with sufficient trees of acceptable commercial species. The area for not-satisfactorily-restocked lands includes current and backlog (pre 1982) not-satisfactorily restocked lands. The increase in area is attributable to current disturbances. The increase between 1988/89 and 1989/90 is attributable to the two-year inventory update schedule. Anticipated regeneration delay may be between one and seven years on current not-satisfactorily-restocked lands. Also includes non-commercial areas, either covered with commercial tree species or 60 per cent or more with brush one or more metres high.
3. Stands with lodgepole pine and whitebark pine or deciduous species as the leading species are immature if the stand age is 80 years or less; when the stand age is greater than 80 years, the stand is mature. Otherwise, all stands having conifers other than lodgepole pine and whitebark pine as the leading species are immature when age is 120 years or less; when the stand age is greater than 120 years, the stand is mature.

Table 5: Deletion of land from provincial forests in 1989-90, by region

Region	Designated use of land deleted					
	Agriculture	Industry and transportation	Parks and recreation	Settlement	Other	Totals
	hectares					
Cariboo	3 164	13	-	800	4	3 981
Kamloops	-	-	329	134	* 15	478
Nelson	92	8	200	95	-	395
Prince George	691	6	-	97	-	794
Prince Rupert	65	-	45	73	** 20	203
Vancouver	-	1	1 976	279	** 65	2 321
Totals	4 012	28	2 550	1 478	104	8 172

* Indian cut-off lands.
** Land exchange.

IV. Detailed Financial Tables

Note: All financial data for 1989-90 contained in Section IV is based on an accrual accounting system and is unaudited.

Note: Expenditures include some amounts for non-timber purposes.

Table A-1: Minister's office expenditures in 1989-90, by category of expenditure

Category	Totals
	-- '000 --
Salaries	$ 229
Professional services	6
Other expenses	25
Total	$ 260

Table B-1: Management Services expenditures in 1989-90, by activity

Activity	Totals
	-- '000 --
Deputy minister's office[1]	$1,293
Assistant deputy minister's office	310
Financial Services	3,128
Human Resources	1,907
Audit Services	417
Information Systems[2]	21,611
Technical and Administrative Services	24,946
Public Affairs and Library Services	1,138
Program Administration	
Management	15,208
Administration	13,481
Technical and Administrative Services	12,213
Relocation and job interviews	1,927
Total	$97,579

Note:
1. Includes Policy and Planning Branch expenditures of $ 0.318 million.
2. Includes $ 6.7 million in systems-development projects.

Table C-1: Harvesting expenditures in 1989-90, by activity and region

Activity	Cariboo	Kamloops	Nelson	Prince George	Prince Rupert	Vancouver	Victoria	Totals
				'000				
Timber valuation[1]	$952	$1,036	$980	$1,261	$1,118	$3,929	$4,341	$13,617
Timber harvesting[2]	999	1,600	1,869	2,173	(50)	1,804	6,199	14,594
Engineering and roads	1,559	1,856	3,209	3,698	1,531	3,020	1,038	15,911
Industry development and marketing	-	-	-	-	-	-	6,773	6,773
Totals	$3,510	$4,492	$6,058	$7,132	$2,599	$8,753	$18,351	$50,895

Notes:

1. Includes $ 3.913 million in scaling expenditures.
2. Excludes $ 11.440 million transferred to the Small Business Forest Enterprise Program for administration expense (see Table M-1).

Table D-1: Silviculture expenditures (Ministry Vote only) in 1989-90, by activity and region

Activity	Cariboo	Kamloops	Nelson	Prince George	Prince Rupert	Vancouver	Victoria	Totals
				'000				
Administration[1]	$1,788	$2,720	$2,432	$3,361	$1,660	$3,320	$6,167	$21,448
Fires and pest component	883	72	1,169	585	-	-	-	2,709
Seed operations	-	-	-	-	-	-	6,395	6,395
Nursery operations	-	-	-	-	-	-	6,004	6,004
Extension services	-	-	-	-	-	-	14,303	14,303
Ministry and industry outstanding activities	9,393	12,315	8,300	24,904	16,994	11,902	-	83,808
Totals	$12,064	$15,107	$11,901	$28,850	$18,654	$15,222	$32,869	$134,667

Note:

1. Excludes $3.240 million transferred to the Small Business Forest Enterprise Program for administration expenses (see Table M-1).

Table E-1: Research expenditures in 1989-90, by activity and region

Activity	Cariboo	Kamloops	Nelson	Prince George	Prince Rupert	Vancouver	Victoria	Totals
				'000				
Management and support	-	-	-	-	-	-	$1,502	$1,502
Technical support group	-	-	-	-	-	-	1,782	1,782
Forest renewal	-	-	-	-	-	-	2,231	2,231
Integrated resource management	-	-	-	-	-	-	1,380	1,380
Production and decision aids	-	-	-	-	-	-	723	723
Regional sciences	$603	$533	$528	$523	$804	$697	-	3,688
Totals	$603	$533	$528	$523	$804	$697	$7,618	$11,306

Table F-1: Forest Protection expenditures in 1989-90, by activity and region

Activity	Cariboo	Kamloops	Nelson	Prince George	Prince Rupert	Vancouver	Victoria	Totals
				'000				
Administration[1]	$308	$1,194	$426	$1,042	$1,016	$1,092	$1,461	$6,539
Fire management	510	393	948	662	739	136	314	3,702
Pest management	808	1,309	1,329	794	488	161	691	5,580
Air operations	163	152	119	154	139	20	147	894
Planning development and research	-	-	-	-	-	-	569	569
Totals	$1,789	$3,048	$2,822	$2,652	$2,382	$1,409	$3,182	$17,284

Note:

1. Excludes $0.645 million transferred to the Small Business Forest Enterprise Program for administration expenses (see Table M-1).

Table G-1: Integrated Resources Management expenditures in 1989-90, by activity and region

Activity	Cariboo	Kamloops	Nelson	Prince George	Prince Rupert	Vancouver	Victoria	Totals
				'000				
Administration	$3	$7	$5	$8	$4	$28	$2,090	$2,145
Planning	433	295	769	396	471	408	346	3,118
Range management	1,246	1,632	939	905	372	11	267	5,372
Recreation management	748	939	799	874	532	1,156	297	5,345
Totals	$2,430	$2,873	$2,512	$2,183	$1,379	$1,603	$3,000	$15,980

Table H-1: Inventory expenditures in 1989-90, by activity and region

Activity	Cariboo	Kamloops	Nelson	Prince George	Prince Rupert	Vancouver	Victoria	Totals
				'000				
Administration	$1	$2	$2	$2	$1	$5	$354	$367
Map loading/ digitizing	70	144	98	850	284	45	1,758	3,249
Periodic re-inventory and tree farm licences	214	223	358	380	376	-	470	2,021
Inventory maintenance	338	479	424	487	289	1,725	594	4,336
Growth and yield	10	79	83	9	493	-	502	1,176
Statistics	-	-	-	-	-	-	613	613
Forest resource analysis	-	-	-	-	-	-	840	840
Systems operation and maintenance	-	-	-	-	-	-	894	894
Totals	$633	$927	$965	$1,728	$1,443	$1,775	$6,025	$13,496

Table I-1: Direct fire-fighting expenditures in 1989-90, by activity and region

Activity	Cariboo	Kamloops	Nelson	Prince George	Prince Rupert	Vancouver	Victoria	Totals
				'000				
Resource availability	$80	$190	$225	$140	$272	$194	$2,824	$3,925
Direct fire fighting	1,220	2,384	3,645	4,569	2,465	1,529	4,012	19,824
Emergency equipment	(1)[1]	2	3	3	2	15	2,695	2,719
Fire detection flying	123	209	401	635	155	72	24	1,619
Air tanker support	324	435	488	642	250	457	513	3,109
Fire support	679	1,237	2,644	2,750	1,589	894	398	10,191
Other expenses	1	1	134	14	-	-	15	165
Totals	$2,426	$4,458	$7,540	$8,753	$4,733	$3,161	$10,481	$41,552

1. Reflects a credit for prior year's purchase.

Table J-1: Fire suppression preparedness expenditures in 1989-90, by activity and region

Activity	Cariboo	Kamloops	Nelson	Prince George	Prince Rupert	Vancouver	Victoria	Totals
				'000				
Initial attack crews	$654	$493	$372	$662	$286	$586	$1,469	$4,522
Detection and surveillance	109	116	169	313	307	25	7	1,046
Weather and fire behavior	268	324	241	310	356	226	294	2,019
Equipment purchases	11	91	143	93	5	198	1,067	1,608
Aircraft availability	-	1	5	43	2	-	10,192	10,243
Air tanker bases	145	152	143	179	132	136	1,690	2,577
Planning, research and systems	-	-	-	-	-	-	2,666	2,666
Totals	$1,187	$1,177	$1,073	$1,600	$1,088	$1,171	$17,385	$24,681

Table K-1: Forest Resource Development Agreement expenditures in 1989-90, by activity and region

Activity	Cariboo	Kamloops	Nelson	Prince George	Prince Rupert	Vancouver	Victoria	Totals
				'000				
Backlog reforestation	$2,876	3,479	$5,051	$11,651	$2,894	$1,460	$13,765	$41,176
Intensive forest management	2,313	1,766	2,378	2,319	2,025	8,098	619	19,518
Implementation communication and evaluation	230	365	846	1,007	467	430	1,578	4,923
Totals	$5,419	$5,610	$8,275	$14,977	$5,386	$9,988	$15,962	$65,617

Table L-1: Forest Stand Management Fund expenditures in 1989-90, by activity and region

Activity	Cariboo	Kamloops	Nelson	Prince George	Prince Rupert	Vancouver	Victoria	Totals
				'000				
Community Forestry Program	$655	$1,209	$473	$321	$299	$1,454	$104	$4,515
Totals	$655	$1,209	$473	$321	$299	$1,454	$104	$4,515

Table M-1: Small Business Forest Enterprise Program expenditures in 1989-90, by activity and region

Activity	Cariboo	Kamloops	Nelson	Prince George	Prince Rupert	Vancouver	Victoria	Totals
	'000							
Administration[1]	$1,695	$2,222	$1,414	$2,300	$2,914	$4,530	$250	$15,325
Harvesting	2,653	5,287	3,749	4,816	5,985	8,670	-	31,160
Silviculture	825	1,592	1,038	3,561	2,269	1,007	-	10,292
Protection	158	167	137	91	182	180	-	915
Totals	$5,331	$9,268	$6,338	$10,768	$11,350	$14,387	$250	$57,692

Note:

1. Transferred from Harvesting ($11.440 million), Silviculture ($3.240 million) and Protection ($0.645 million) programs.

Table N-1: South Moresby Implementation expenditures in 1989-90, by activity and region

Activity	Cariboo	Kamloops	Nelson	Prince George	Prince Rupert	Vancouver	Victoria	Totals
	'000							
Forest Replacement								
Intensive silviculture	-	-	-	-	$208	$1,984	-	$2,192
Inventory	-	-	-	-	-	131	-	131
Research and demonstration	-	-	-	-	-	300	-	300
Implementation	-	-	-	-	-	9	-	9
Sub-totals	-	-	-	-	$208	$2,424	-	$2,632
Forestry Compensation	-	-	-	-	-	$265	-	$265
Totals	-	-	-	-	$208	$2,689	-	$2,897

Table P-1: Silviculture expenditures in 1989-90, by activity and region

Funding Source	Cariboo	Kamloops	Nelson	Prince George	Prince Rupert	Vancouver	Victoria	Totals
				'000				
Ministry Sources								
Vote[1]	$12,064	$15,107	$11,901	$28,850	$18,654	$15,222	$32,869	$134,667
FRDA[2]	5,419	5,610	8,275	14,977	5,386	9,988	15,962	65,617
SBFEP[3]	825	1,592	1,038	3,561	2,269	1,007	-	10,292
FSMF[4]	655	1,209	473	321	299	1,454	104	4,515
SMFRA[5]	-	-	-	-	208	1,993	-	2,201
Sub-totals	18,963	23,518	21,687	47,709	26,816	29,664	48,935	217,292
Other sources[6]	12	524	49	573	25	361	-	1,544
Totals[7]	$18,975	$24,042	$21,736	$48,282	$26,841	$30,025	$48,935	$218,836

Notes:
1. Ministry Vote (see Table D-1).
2. Canada-British Columbia Forest Resource Development Agreement (see Table K-1).
3. Small Business Forest Enterprise Program (see Table M-1).
4. Forest Stand Management Fund (see Table L-1).
5. South Moresby Forest Replacement Account (see Table N-1). Excludes research and inventory expenditures.
6. Other sources includes federal job-creation programs ($ 1.078 million) and the Joint Job Creation Program ($ 0.466 million) — see Table P-10 — and represents the value of the accomplishments carried out by the programs.
7. Does not include expenditures by the private sector on silviculture activities.

V. Detailed Statistical Tables

Table C-2: Average stumpage prices[1] in 1989-90, by region and species[2]

Region	Balsam		Cedar		Cypress		Douglas-fir	
	Volume	Price	Volume	Price	Volume	Price	Volume	Price
	(000 m³)	($/m³)	(000 m³)	($/m³)	(000 m³)	($/m³)	(000 m³)	($/m³)
Cariboo:								
Coast	-	-	-	-	-	-	-	-
Interior	417	7.00	66	2.37	-	-	738	9.13
Kamloops	729	5.73	345	4.14	1	1.91	1 147	8.12
Nelson	471	5.89	567	3.70	-	0.69	629	7.32
Prince George	2 209	8.62	26	3.85	-	14.14	319	12.77
Prince Rupert:								
Coast	182	7.35	84	7.94	10	5.57	-	-
Interior	1 782	3.81	191	2.90	1	1.02	1	5.39
Vancouver:								
Coast	2 867	8.79	3 827	10.47	560	10.05	1 556	8.11
Interior	99	2.52	15	4.32	4	2.55	91	5.35
Totals	8 756		5 121		575		4 481	
Weighted Average		$7.14		$8.81		$9.89		$8.44

Region	Hemlock		Larch		Lodgepole pine		Spruce	
	Volume	Price	Volume	Price	Volume	Price	Volume	Price
	(000 m³)	($/m³)	(000 m³)	($/m³)	(000 m³)	($/m³)	(000 m³)	($/m³)
Cariboo:								
Coast	-	-	-	-	-	-	-	-
Interior	40	1.79	-	0.25	4 964	4.07	1 851	7.10
Kamloops	264	2.78	72	6.25	3 139	4.90	1 740	6.86
Nelson	457	4.27	305	7.50	2 146	4.99	976	6.13
Prince George	28	3.33	-	7.99	5 430	9.37	7 635	9.47
Prince Rupert:								
Coast	271	6.56	-	-	-	0.60	110	8.78
Interior	2 463	1.15	-	-	1 639	8.39	1 363	7.00
Vancouver:								
Coast	6 512	9.49	-	-	8	6.49	629	13.05
Interior	69	2.68	-	-	10	0.74	68	5.04
Totals	10 104		378		17 337		14 371	
Weighted Average		$6.87		$7.26		$6.40		$8.52

(Table C-2 continued on page 84)

Table C-2: Average stumpage prices[1] in 1989-90, by region and species[2] (continuation)

Region	White pine		Other species		All species	
	Volume	Price	Volume	Price	Volume	Price
	(000 m³)	($/m³)	(000 m³)	($/m³)	(000 m³)	($/m³)
Cariboo:						
Coast	-	-	-	-	-	-
Interior	-	1.15	15	0.62	8 091	5.34
Kamloops	48	6.33	31	3.93	7 516	5.83
Nelson	93	8.11	30	7.80	5 675	5.53
Prince George	1	2.49	221	1.12	15 869	9.25
Prince Rupert:						
Coast	-	-	3	3.65	660	7.29
Interior	-	-	19	0.39	7 458	4.49
Vancouver:						
Coast	25	8.53	103	1.10	16 087	9.57
Interior	4	1.96	2	5.56	362	3.77
Totals	172		424		61 718	
Weighted Average		$7.48		$1.78		$7.43

Notes:

1. Based on gross stumpage received on timber billed from tree farm licences, forest licences and timber sale licences. Volume excludes firmwood rejects and waste. Excludes stumpage received from Small Business Forest Enterprise Program sales.
2. Since October 1987, most timber has been sold with a single stumpage rate for each stand. These average stumpage rates should be read in that context.

* Indicates volume less than 500 m³.

Table C-3: Volume of all products billed[1] in 1989-90, by region and land status

Land status	Cariboo	Kamloops	Nelson	Prince George	Prince Rupert	Vancouver	Totals
				'000 m^3			
Crown land							
Tree farm licence[2]	122	871	1 585	821	1362	9 118	13 879
Forest licence	7 329	6 285	3 998	13 727	6 407	6 882	44 628
Timber sale licence (Outside Small Business Forest Enterprise Program)	338	274	66	297	213	147	1 335
Timber sale licence (Small Business Forest Enterprise Program)	907	1 200	965	2 063	2 013	1 969	9 117
Licence to cut	236	82	14	629	134	54	1 148
Timber licence - stumpage bearing	-	2	-	-	-	-	2
Royalty within tree farm licence	-	-	-	-	59	2 930	2 989
Royalty outside tree farm licence	-	66	114	40	214	2 789	3 222
Woodlot licence	72	53	37	136	27	97	422
Other[3]	27	8	47	321	147	362	912
Sub-totals	9 031	8 840	6 828	18 034	10 575	24 347	77 654
Private land[4]							
Within tree farm licence	-	-	13	-	-	533	545
Within woodlot licence	-	-	-	-	-	-	-
Outside tree farm licence and woodlot licence	614	934	1 334	1 211	389	3 980	8 461
Sub-totals	614	934	1 346	1 211	389	4 512	9 006
Federal land and Indian reserves	2	23	12	24	90	123	274
Totals[5]	9 647	9 797	8 186	19 269	11 054	28 982	86 935

Notes:

1. Includes firmwood rejects.
2. Includes schedule B lands only.
3. Includes rights-of-way, beachcomb, trespass and miscellanea.
4. All Crown-granted lands.
5. Columns may not add due to rounding.

Table C-4: Volume of all products billed[1,2] in 1989-90, by region and species

Region	Balsam	Cedar	Cypress	Douglas fir	Hemlock	Larch	Lodgepole pine	Spruce	White pine	Other	Totals
	'000 m^3										
COAST											
Cariboo	-	-	-	-	-	-	-	-	-	-	-
Prince Rupert	297	168	15	-	453	-	-	151	-	20	1 105
Vancouver	4 790	6 730	939	3 987	10 588	-	21	928	52	576	28 611
Sub-totals	5 086	6 898	954	3 987	11 041	-	21	1 079	52	596	29 716
INTERIOR											
Cariboo	457	74	-	1 104	41	-	5 740	2 139	-	91	9 647
Kamloops	839	507	1	1 813	399	118	3 895	1 987	67	171	9 797
Nelson	604	888	-	1 113	755	479	2 824	1 234	131	158	8 186
Prince George	2 545	36	-	422	55	1	6615	8986	2	606	19 269
Prince Rupert	2 249	272	1	2	2 941	-	2 406	1 928	-	151	9 949
Vancouver	100	17	4	94	70	-	11	69	4	2	371
Sub-totals	6 794	1 794	6	4 549	4 261	598	21 490	16 343	204	1 180	57 219
Totals[3]	11 880	8 692	960	8 536	15 302	598	21 511	17 422	256	1 776	86 935

Notes:

1. Includes firewood rejects.
2. Includes all harvesting on Crown, private and federal lands and Indian Reserves.
3. Columns may not add due to rounding.

Table C-5: Area harvested in 1989-90, by region

Region	Harvesting method	Crown land				Private land				Totals
		TFL[1]	TSA[2]	Other[3]	Sub-total	TFL[4]	TSA[5]	Other[6]	Sub-total	
		hectares								
Cariboo	Clear-cut	259	40 495	1 878	42 632	-	-	3160	3160	45 792
	Selective cut	-	4 828	442	5 270	-	-	406	406	5 676
	Sub-totals	259	45 323	2 320	47 902	-	-	3 566	3566	51 468
Kamloops	Clear-cut	1 886	12 408	-	14 294	-	2 414	-	2 414	16 708
	Selective cut	238	3 414	97	3 749	-	1 635	-	1 635	5 384
	Sub-totals	2 124	15 822	97	18 043	-	4 049	-	4 049	22 092
Nelson	Clear-cut	3 145	6 630	67	9 842	-	-	-	-	9 842
	Selective cut	1 519	4 422	99	6 040	-	-	17	17	6 057
	Sub-totals	4 664	11 052	166	15 882	-	-	17	17	15 899
Prince George	Clear-cut	3 799	52 339	3 640	59 778	-	1 658	3 579	5 237	65 015
	Selective cut	-	212	-	212				-	212
	Sub-totals	3 799	52 551	3 640	59 990	-	1 658	3 579	5 237	65 227
Prince Rupert	Clear-cut	3 095	25 974	10	29 079	197	2322	631	3 150	32 229
	Selective cut	-	1 380	-	1 380	-	-	-	-	1 380
	Sub-totals	3 095	27 354	10	30 459	197	2 322	631	3 150	33 609
Vancouver	Clear-cut	6 849	14 821	107	21 777	1 038	6 009	837	7 884	29 661
	Selective cut	-	9	72	81	-	325	22	347	428
	Sub-totals	6 849	14 830	179	21 858	1 038	6 334	859	8 231	30 089
Sub-totals	Clear-cut	19 033	152 667	5 702	177 402	1 235	12 403	8 207	21 845	199 247
	Selective cut	1 757	14 265	710	16 732	-	1 960	445	2 405	19 137
Totals		20 790	166 932	6 412	194 134	1 235	14 363	8 652	24 250	218 384

Notes:

1. Includes Crown land within tree farm licences.
2. Includes Crown land within timber supply areas, excluding tree farm licences.
3. Includes Crown land within woodlot licences, federal lands and Indian Reserves.
4. Includes private land within tree farm licences.
5. Includes private land outside tree farm licences.
6. Includes private land within woodlot licence, federal lands and Indian Reserves.

Table C-6: Volume of logs exported from B.C. in 1989-90, by species

Species	Exported under permit[1]	Other exports[2]	Total
	'000 m^3		
Balsam	325	18	343
Cedar	*	*	*
Cypress	12	22	34
Douglas-fir	60	46	106
Hemlock	529	66	595
Lodgepole pine	58	*	58
Spruce	296	10	306
Other softwood	16	2	18
Cottonwood	55	6	61
Other hardwood	40	4	44
Totals	1 391	174	1 565

Notes:

1. Export permit granted under Section 137 of the Forest Act. Logs harvested from provincial Crown land, private land within a tree farm licence area, and from private land granted by the Crown after March 12, 1906.
2. No export permit required under the Forest Act. Logs harvested from private land that was granted by the Crown prior to March 13, 1906, and is not within a tree farm licence area, and logs harvested from federal land and Indian reserves.

* Indicates volume under 500 cubic metres.

Table C-7: Number of licences as of March 31, 1990, by region

Form of rights to timber	Cariboo	Kamloops	Nelson	Prince George	Prince Rupert	Vancouver	Total
				number			
Regular licences							
Tree farm licence[1]	1	5	5	4	3	14	32
Woodlot licence	89	78	54	157	44	34	456
Forest licence	15	25	31	28	21	57	177
Timber sale licence (pulpwood agreement)	0	0	0	4	0	0	4
Timber sale licence (major)	13	40	32	20	14	48	167
Timber sale licence (minor) SBFEP[2]	142	588	130	158	236	227	1,481
Other[3]	24	62	20	34	35	148	323
Sub-totals	284	798	272	405	353	528	2,640
Temporary licences							
Forest licence[4,5]	8	0	2	7	4	10	31
Timber sale licence SBFEP[6]	5	1	0	0	4	3	13
Sub-totals	13	1	2	7	8	13	44
Totals	297	799	274	412	361	541	2,684

Notes:

1. Tree Farm Licence 25 is in both the Vancouver and Prince Rupert forest regions.
2. Small Business Forest Enterprise Program (SBFEP): actual number of licences as of March 31, 1990.
3. Licences issued within the Forest Service reserve. This total includes forest licences in effect on March 31, 1990, and licences for salvage sales, cash sales, free-use permits, etc.
4. Special Forest Licence in Lot 7741 Military Reserve.
5. Special forest licences, e.g., salvage sales.
6. Special timber sale licences.

Table C-8: Volume committed as of March 31, 1990, by region

Form of rights to cut timber	Cariboo	Kamloops	Nelson	Prince George	Prince Rupert	Vancouver	Totals
				'000 m^3			
Regular licences							
Tree farm licence[1]	110	768	1 470	1 158	1 260	13 913	18 679
Woodlot licence	65	65	37	135	33	44	379
Forest licence[4]	6 977	5 714	4 021	12 921	5 946	7 781	43 360
Timber sale licence (pulpwood agreement)	-	-	-	1 624	-	-	1 624
Timber sale licence (major)	142	14	57	35	26	61	335
Timber sale licence SBFEP[3,5]	1 603	1 137	824	2 111	1 811	1 790	9 276
Forest Service reserve[2]	42	60	163	153	164	85	667
Totals	8 939	7 758	6 572	18 137	9 240	23 674	74 320

Notes:

1. Tree Farm Licence 25 is in both the Vancouver and Prince Rupert forest regions.
2. Volume apportioned to the Forest Service reserve.
3. Timber sale licence SBFEP includes volume for timber sale licence major that is not more than 10 000 cubic metres. Volume is apportioned by allowable annual cut.
4. Includes non-replaceable forest licence.
5. Includes non-replaceable timber sale licences.

Table C-9: Forest Service road construction, inventory and construction costs in 1989-90, by region and road size

Region	Road size[1]	Construction: By licensee[2]	Construction: By ministry[3]	Current inventory[4]	Construction cost[5]
		kilometres			$'000
Cariboo	Double lane	-	9.8	829.3	$300
	Single lane	1.5	66.2	3 063.1	1,296
	Sub-totals	1.5	76.0	3 892.4	1,596
Kamloops	Double lane	-	-	-	-
	Single lane	3.5	157.0	8 530.5	2,567
	Sub-totals	3.5	157.0	8 530.5	2,567
Nelson	Double lane	-	5.0	263.0	40
	Single lane	11.0	111.7	7 973.2	2,358
	Sub-totals	11.0	116.7	8 236.2	2,398
Prince George	Double lane	67.8	17.8	2 392.0	575
	Single lane	32.3	117.1	4 246.1	3,147
	Sub-totals	100.1	134.9	6 638.1	3,722
Prince Rupert	Double lane	-	-	378.0	-
	Single lane	25.6	119.7	2 025.7	3,381
	Sub-totals	25.6	119.7	2 403.7	3,381
Vancouver	Double lane	3.0	-	124.2	-
	Single lane	16.2	62.7	3 908.7	3,642
	Sub-totals	19.2	62.7	4 032.9	3,642
Provincial Sub-totals	Double lane	70.8	32.6	3 986.5	915
	Single lane	90.1	634.4	29 747.3	16,391
Totals		160.9	667.0	33 733.8	$17,306

Notes:

1. Forest Service road sizes:
   - Double lane, Class 1 (10 metres wide)
   - Class 2 (nine metres wide)
   - Class 3 (eight metres wide)
   - Single lane, Class 4 (six metres wide)
   - Class 5 (five metres wide)
   - Class 6 (four metres wide)
2. Forest Service roads constructed by licensee with the costs reflected in the calculation of stumpage.
3. Includes works approved under the Small Business Forest Enterprise Program and the Emergency Bark Beetle Program.
4. March 31, 1990. Includes transfers to and from other government agencies and private ownership, and cancellations.
5. Licensee costs not included.

Table C-10: Forest Service road improvement, upgrading and maintenance, with costs, in 1989-90, by region and road size

Region	Road size[1]	Improvements/ upgrading[2]		Maintenance[3]		
		By licensee[4]	By ministry[5]	By ministry[5]	Improvements/ upgrading[6]	Maintenance[6]
		kilometres			$'000	
Cariboo	Double lane	-	-	32.0	-	-
	Single lane	50	38.2	55.3	416	169
	Sub-totals	50	38.2	87.3	416	169
Kamloops	Double lane	-	-	-	-	-
	Single lane	-	78.5	772.1	762	410
	Sub-totals	-	78.5	772.1	762	410
Nelson	Double lane	-	-	8.0	-	26
	Single lane	6	88.4	1 162.2	254	595
	Sub-totals	6	88.4	1 170.2	254	621
Prince George	Double lane	1	32	1 291.8	21	148
	Single lane	54.5	122.8	2 372.2	406	261
	Sub-totals	55.5	154.8	3 664.0	427	409
Prince Rupert	Double lane	-	-	-	-	-
	Single lane	18.6	43	433.8	417	386
	Sub-totals	18.6	43	433.8	417	386
Vancouver	Double lane	-	-	73.8	-	-
	Single lane	26.6	181.2	1 212.7	1,243	503
	Sub-totals	26.6	181.2	1 286.5	1,243	503
Provincial Sub-totals	Double lane	1	32	1 405.6	21	174
	Single lane	155.7	552.1	6 008.3	3,498	2,324
Totals		156.7	584.1	7 413.9	$3,519	$2,498

Notes:

1. Forest Service road sizes:
   - Double lane, Class 1 (10 metres wide)
   - Class 2 (nine metres wide)
   - Class 3 (eight metres wide)
   - Single lane, Class 4 (six metres wide)
   - Class 5 (five metres wide)
   - Class 6 (four metres wide)
2. Improvement beyond general surface maintenance: all aspects of structural maintenance, including road 'reconstruction.'
3. Surface maintenance that includes culvert repairs and replacement of small culverts, cleaning of ditches, bank clearing, spot gravelling and surface grading.
4. Forest Service road improvements by the licensee and costs reflected in the calculation of stumpage.
5. Includes works approved under the Small Business Forest Enterprise Program and the Emergency Bark Beetle Program.
6. Licensees' costs are not included.

Table C-11: Forest Service bridge and major culvert construction, inventory and costs in 1989-90, by region and bridge class

Region	Structure class[1]	Construction[2] By licensee[3]	Construction[2] By ministry[4]	Current inventory[5]	Ministry cost[6] Construction	Ministry cost[6] Inspection and maintenance
		number			'000	
Cariboo	P	2	5	51	$174	$4
	SP	-	4	29	150	2
	T	-	1	90	14	6
	MC	-	3	31	79	2
	Sub-totals	2	13	201	$417	$14
Kamloops	P	7	14	94	714	10
	SP	-	4	57	118	14
	T	2	-	402	-	54
	MC	-	3	38	24	4
	Sub-totals	9	21	591	$856	$82
Nelson	P	-	6	78	174	3
	SP	-	12	101	331	7
	T	-	7	650	46	21
	MC	-	3	127	24	-
	Sub-totals	-	28	956	$575	$31
Prince George	P	7	12	179	572	164
	SP	3	2	73	55	6
	T	4	3	121	141	27
	MC	-	8	186	97	4
	Sub-totals	14	25	559	$865	$201
Prince Rupert	P	7	9	86	719	2
	SP	-	-	10	-	-
	T	-	1	101	26	4
	MC	1	1	33	5	-
	Sub-totals	8	11	230	$750	$6
Vancouver	P	2	8	75	637	6
	SP	3	9	78	507	3
	T	5	23	539	284	49
	MC	1	4	50	64	-
	Sub-totals	11	44	742	$1,492	$58
Provincial Sub-totals	P	25	54	563	2,990	189
	SP	6	31	348	1,161	32
	T	11	35	1,903	511	161
	MC	2	22	465	293	10
Totals		44	142	3,279	$4,955	$392

Notes:

1. Forest Service structure classes:
   - P: Permanent: Any bridge having all of its major components constructed of steel, concrete, or timber that has been pressure-treated with a suitable preservative.
   - SP: Semi-Permanent: Any bridge having a substantial proportion of its components constructed of steel, concrete, or timber that has been pressure-treated with a suitable preservative.
   - T: Temporary: Any bridge having most of its components constructed of untreated wood.
   - MC: Major Culverts: A minimum diameter of 1 800 mm.
2. Includes replacement structures.
3. As approved under 'main access' policy, with cost reflected in the calculation of stumpage.
4. Includes works approved under the Small Business Forest Enterprise Program and the Emergency Bark Beetle Program.
5. March 31, 1990. Includes transfers to and from other government agencies and private ownership, deletions and closures.
6. Licensee costs not included.

Table D-2: Basic silviculture accomplishments on Crown land funded by the ministry[3], by region.

Silviculture activity	Cariboo	Kamloops	Nelson	Prince George	Prince Rupert	Vancouver	Totals
	hectares						
Surveying	66 371	72 659	60 923	55 208	53 273	67 484	375 917
Preparing sites	5 021	8 598	4 602	16 264	6 104	2 014	42 603
Planting	8 702	14 059	10 679	27 698	19 009	12 774	92 921
Brushing	1 833	2 841	988	12 901	8 943	9 958	37 464
Conifer release	83		29	-	-	253	365
Spacing[1]	2 858	423	320	474	48	1 792	5 915
Rehabilitation sites		11	69	-	-	-	80
Other[2]	2 386		1 314	822	-	66	4 588
Totals	87 254	98 591	78 924	113 367	87 377	94 341	559 853
	'000						
Seedlings planted	12 751	17 775	13 287	37 423	23 832	9 916	114 984

Notes:

1. Includes spacing of young conifers and the falling of diseased and damaged trees.
2. Includes pruning, controlling of mistletoe, and falling snags and residual trees.
3. Includes all silviculture accomplishments funded through the ministry vote for basic silviculture. Includes silviculture activities on areas denuded under the Small Business Forest Enterprise Program and by licensees between 1982 and October 1, 1987. Silviculture activities are carried out under the supervision of the ministry and licensees.

Table F-2: Number and causes of wildfires in 1989-90, by region

Cause	Cariboo		Kamloops		Nelson		Prince George		Prince Rupert		Vancouver		Totals	
	1989-1990	10-year average	1989-1990	10-year average	1989-1990	10-year average	1989-1990	10-year average	1989-1990	10-year average	1989-1990	10-year average	1989-1990	10-year average
	number of wildfires													
Lightning	189	133	461	312	686	349	373	288	201	78	117	107	2,027	1,267
Recreation[1]	12	17	37	52	23	27	21	31	41	28	72	50	206	205
Railroads	6	4	18	25	8	10	5	8	4	2	13	11	54	60
Smokers	12	25	26	54	20	31	13	20	14	17	41	45	126	192
Brush burning[2]	30	22	45	29	27	13	67	40	32	21	39	22	240	147
Range burning	22	29	4	6	1	1	19	12	5	2	0	0	51	50
Construction[3]	2	2	1	2	2	2	7	4	9	3	13	4	34	17
Industrial[4]	37	29	56	43	43	37	64	45	64	30	71	52	335	236
Incendiary	33	74	12	26	10	10	30	34	17	13	5	8	107	165
Miscellaneous known causes	58	56	66	80	32	38	56	25	53	38	37	30	302	267
Unknown causes	3	2	11	3	3	2	4	2	8	2	9	3	38	14
Totals	404	393	737	632	855	520	659	509	448	234	417	332	3,520	2,620

Notes:

1. Campers, hunters, fishermen, etc.
2. Excluding railway or right-of-way clearing.
3. Road, power, phone, pipeline, and right-of-way construction.
4. Timber harvesting, mining and other industries.

Table F-3: Area burned by wildfires[1] in 1989-90, by region

Region	Merchantable timber		Immature timber		Other cover		Totals	
	1989-1990	10-year average	1989-1990	10-year average	1989-1990	10-year average	1989-1990	10-year average
	hectares							
Cariboo	119	1 268	133	527	444	1 324	696	3 119
Kamloops	316	805	64	415	743	1 223	1 123	2 443
Nelson	977	3 895	434	1 728	670	1 509	2 081	7 132
Prince George	3 611	17 637	1 077	8 983	8 706	27 763	13 394	54 383
Prince Rupert	4 073	17 427	58	8 837	2 917	5 586	7 048	31 850
Vancouver	180	948	47	386	811	737	1 038	2 071
Totals	9 276	41 980	1 813	20 876	14 291	38 142	25 380	100 998

Note:

1. Includes wildfires on not-satisfactorily-restocked forest land, non-commercial forest land, grazing land, and non-productive sites.

Table F-4: Timber burned by wildfires[1] in 1989-90, by region

Region	Merchantable timber	Immature timber[2]	Totals
	'000 m^3		
Cariboo	13.5	8.2	21.7
Kamloops	71.6	3.4	75.0
Nelson	130.7	28.7	159.4
Prince George	555.1	78.1	633.2
Prince Rupert	888.0	2.0	890.0
Vancouver	52.6	8.2	60.8
Totals[3]	1 711.6	128.5	1 840.2

Notes:

1. RAP report by region before salvage. Burned timber is salvaged wherever practical.
2. Estimates based on species and generalized information on age and site. Assumes complete mortality.
3. Numbers may not add due to rounding.

Table F-5: Area under attack by forest pests[1] in 1989-90, by region

Region	Bark beetles[2]	Defoliators	Totals[3]
	hectares		
Cariboo	4 020	2 800	6 820
Kamloops	13 425	148 420	161 845
Nelson	33 700	22 600	56 300
Prince George	6 810	127 950	134 760
Prince Rupert	18 275	0	18 275
Vancouver	1 900	12 280	14 180
Totals	78 130	314 050	392 180

Notes:

1. Best available estimates of current annual losses as compiled by Forestry Canada except for the Cariboo forest region values. Accuracy varies, depending on pest.
2. Area of forests killed by bark beetles is estimated from aerial surveys in 1989. Represents trees killed in 1988.
3. Many more pests are endemic throughout most forests. Estimates of area under attack are meaningless for these pests without detailed measures of the intensity of infestation.

Table F-6: Timber damaged by forest pests[1] in 1989-90, by region

Region	Bark beetle[2]	Dwarf defoliators	Root mistletoes[3]	Diseases	Totals[4]
	'000 m^3				
Cariboo	70	12	350	221	653
Kamloops	235	638	260	224	1 357
Nelson	590	97	98	58	843
Prince George	119	550	262	529	1 460
Prince Rupert	320	0	315	73	708
Vancouver	33	53	355	262	703
Totals	1 367	1 350	1 640	1 367	5 724

Notes:

1. Best available estimates of current annual losses. Accuracy varies, depending on the pest. Only the major forest pests of B.C. are included. Volumes are estimated before salvage. Attacked timber is salvaged wherever practical.
2. Bark beetle volumes are compiled by Forestry Canada, except for Cariboo forest region values.
3. Estimates for losses occurring on the net land base for dwarf mistletoe and root disease.
4. Volume lost to decay in forests exceeding 100 years of age is not included. This is estimated at 10 million cubic metres per year. Nursery and regeneration losses due to other insects, diseases and unwanted vegetation are also not included.

Table G-2: Grazing permits and grazing licences in 1989-90, by region

Region	Permits			Licences		
	Number	Authorized	Used	Number	Authorized	Used
		AUM[1]			AUM	
Cariboo	496	246,704	223,138	138	112,806	103,053
Kamloops	355	170,797	164,574	145	183,745	179,649
Nelson	228	74,291	71,734	26	9,981	9,467
Prince George	373	86,018	78,658	80	54,134	50,530
Prince Rupert	151	18,505	15,849	36	13,255	12,165
Vancouver	22	3,321	1,537	4	858	861
Totals	1,625	599,636	555,490	429	374,779	355,725

Note:

1. AUM or Animal Unit Month is the amount of forage required for one month by an average beef cow, aged six months or older.

Table G-3: Hay cutting permits and hay cutting licences in 1989-90, by region

Region	Permits			Licences		
	Number	Authorized	Used	Number	Authorized	Used
		tonnes			tonnes	
Cariboo	44	662	555	75	1 516	1 152
Kamloops	0	0	0	3	106	106
Nelson	0	0	0	2	35	5
Prince George	7	231	229	6	93	20
Prince Rupert	3	38	38	7	147	102
Vancouver	1	300	55	0	0	0
Totals	55	1 231	877	93	1 897	1 385

Table G-4: Range improvements[1] on Crown land in 1989-90, by region

Region	Seeding Grassland rehabilitation	Disturbed forest land[2]	Fencing[3]	Weed control[4]	Water development[5]	Other[6]
	hectares		(kilometres)	hectares	numbers	
Cariboo	-	8	70	9	58	-
Kamloops	5 080	-	93	801	125	-
Nelson	88	1 845	80	-	12	30
Prince George	1 238	542	342	82	23	22
Prince Rupert	-	829	46	-	-	14
Vancouver	-	-	2	.5	-	1
Totals	6 406	3 224	633	892.5	218	67

Notes:
1. Excludes improvements funded wholly by the Federal Initiative Program and by private sources.
2. Includes seeding of clearcuts.
3. Includes repair, maintenance and construction of fences.
4. Control of knapweed, thistle, etc.
5. Includes repair, maintenance and development of water sources.
6. Includes repair, maintenance and development of trails, corrals, cattleguards, etc.

Table G-5: Average cost[1] of range improvements[2] on Crown land in 1989-90, by region

Region	Seeding[3]		Fencing[4]		Weed control[5]	
	Total activity	By ministry	Total activity	By ministry	Total activity	By ministry
	$/ha		$/km		$/ha	
Cariboo	$30.5	$18	$2,379	$1,171	$1,317	$1,317
Kamloops	12.8	11.9	2,782	1,153	329	329
Nelson	25.8	24.3	1,747	1,208	-	-
Prince George	154.2	79.3	928	246	-	-
Prince Rupert	19.5	16.9	685	511	-	-
Vancouver	-	-	1,600	800	1,050	1,050

Notes:
1. Based on funds from the Range Management Program, other ministry programs and other sources (on cost-sharing projects).
2. Excludes improvements funded by FEP and exclusively by other non-ministry sources.
3. Combines grassland rehabilitation and seeding of disturbed forest land, mainly clearcuts.
4. Construction of new fences.
5. Includes containment of knapweed, thistle and other weeds.

Table G-6: Recreation site and trail use in 1989-90, by region

Region	Sites		Trails		
	Number	User visits[1]	Number[3]	Length (kilometres)	User visits[2]
Cariboo	195	154,000	38	433	15,000
Kamloops	366	396,000	96	1 725	162,000
Nelson	230	133,000	142	952	82,000
Prince George	239	167,000	62	824	63,000
Prince Rupert	86	50,000	54	370	29,000
Vancouver	190	448,000	179	384	114,000
Totals	1,306	1,348,000	571	4 688	465,000

Notes:

1. Estimates. Based on field surveys.
2. No data for the Lakes District -- data lost in fire.
3. 'Active managed' Forest Service trails comprise only a small percentage of the many trails which can be found throughout the provincial forests. Estimates of numbers and lengths of Forest Service trails is highly dependent on local interpretations of the criteria used to define a trail as 'active and managed.'

Table K-2: Canada-B.C. Forest Resource Development Agreement accomplishments[1] in 1989-90, by region

Program	Sub-program	Cariboo	Kamloops	Nelson	Prince George	Prince Rupert	Vancouver	Totals
		hectares						
Program[1]								
Backlog reforestation	Surveying	36 877	42 449	55 818	62 883	18 959	20 386	237 372
	Rehabilitating sites	2 698	2 098	2 062	13 792	2 437	189	23 276
	Planting	3 359	3 617	7 400	12 286	3 720	1 373	31 755
	Sub-totals	42 934	48 164	65 280	88 961	25 116	21 948	292 403
		'000						
	Seedlings[1] planted	3,996	4,739	6,936	17,793	4,334	1,442	39,240
		hectares						
Program								
Intensive forest management	Brushing	1 091	1 144	565	5 259	1 086	1 816	10 961
	Freeing older conifers from competition	396	282	262	261	219	236	1 656
	Spacing[2]	3 797	1 500	1 911	2 932	1 552	6 145	17 837
	Fertilizing	1 093	1 170	1 254	2 002	1 539	7 846	14 904
	Other[3]	294	484	77	32	517	169	1 573
	Sub-totals	6 671	4 580	4 069	10 486	4 913	16 212	46 931
Totals		49 605	52 744	69 349	99 447	30 029	38 160	339 334

Notes:

1. Includes all silviculture accomplishments funded through the Canada-B.C. Forest Resource Development Agreement. Includes silviculture activities on areas denuded before 1982, under the Small Business Forest Enterprise Program and by licensees. Silviculture activities are carried out under the supervision of the ministry and licensees.
2. Includes spacing of young conifers and the falling of diseased and damaged trees.
3. Includes pruning, controlling of mistletoe, and falling snags and residual trees.

Table L-2: Incremental silviculture accomplishments on Crown land funded by the Forest Stand Management Fund[3], by region.

Silviculture activity	Cariboo	Kamloops	Nelson	Prince George	Prince Rupert	Vancouver	Totals
	hectares						
Surveying	524	1 758	-	-	-	15	2 297
Planting	-	-		-	-	17	17
Brushing	68	111	-	208	115	326	828
Freeing older conifers from competition	239	-	-	-	-	80	319
Spacing[1]	924	317	436	64		855	2 596
Fertilizing	-	-	-	-	-	2	2
Rehabilitating sites	-	-	-	-	13	-	13
Other[2]	47	12	439	30	89	246	863
Totals	1 802	2 198	875	302	217	1 541	6 935
	'000						
Seedlings planted	-	-	-	-	-	9	9

Notes:

1. Includes spacing of young conifers and the falling of diseased and damaged trees.
2. Includes pruning, controlling of mistletoe, and falling snags and residual trees.
3. Includes all silviculture accomplishments funded through the Forest Stand Management Fund. Includes work carried out under the Community Forests Program and the Forestry Enhancement Program. Silviculture activities are carried out under the supervision of the ministry and licensees.

Table M-2: Stumpage revenue[1] from the Small Business Forest Enterprise Program in 1989-90, by region

Regions	Volume billed[2]	Upset stumpage billed[3]	Bonus stumpage billed[4]	Total stumpage billed	Stumpage billed as a per cent of upset stumpage
	'000 m^3	'000			per cent
Cariboo	907	$7,615	$5,823	$13,438	176
Kamloops	1 199	7,019	6,830	13,849	197
Nelson	961	5,362	4,576	9,938	185
Prince George	2 063	25,904	11,491	37,395	144
Prince Rupert	2 040	10,940	18,230	29,170	267
Vancouver	1 889	14,979	27,237	42,216	282
Totals	9 059	$71,819	$74,187	$146,006	203

Notes:

1. Stumpage billed during 1989-90 does not include accruals.
2. Excludes firmwood rejects and waste.
3. Appraised price of timber.
4. Bid for timber, in addition to upset stumpage.

Table M-3: Small Business Forest Enterprise Program in 1989-90, by region

Region	Registrants[1]		Sales			Volume	
	Cat. 1[2]	Cat. 2[3]	Cat. 1	Cat. 2	Other	Sold[4]	Value[5]
	number					'000 m^3	$ '000
Cariboo	272	45	111	31	-	2 026	$26,536
Kamloops	370	100	272	81	235	1 491	18,165
Nelson	240	72	95	35	-	695	9,621
Prince George	335	59	114	22	22	2 385	42,940
Prince Rupert	320	82	172	44	20	2 959	49,308
Vancouver	654	109	188	17	22	3 047	52,432
Totals	2, 191	467	952	230	299	12 603	$199,002

Notes:

1. On March 31, 1990.
2. Category 1: Registrants who do not own or lease a timber-processing facility.
3. Category 2: Registrants who own or lease a timber-processing facility.
4. Tendered volume.
5. Value based upon appraised price at time of sale plus bonus bid, if any.

Table M-4: Silviculture accomplishments on Crown land funded by the Small Business Forest Enterprise Program[1], by region

Silviculture activity	Cariboo	Kamloops	Nelson	Prince George	Prince Rupert	Vancouver	Totals
	hectares						
Surveying	2 800	905	1 590	1 140	2 657	2 457	11 549
Preparing sites	3 145	5 625	1 654	5 637	3 010	-	19 071
Planting	159	146	455	544	1 104	571	2 979
Brushing	103	-	-	-	-	73	176
Spacing[2]	471	-	23	-	-	48	542
Rehabilitating sites	-	19	18	-	-	-	37
Other[3]	1 651	-	-	-	-	26	1 677
Totals	8 329	6 695	3 740	7 321	6 771	3 175	36 031
	'000						
Seedlings planted	198	213	622	736	1 496	514	3 779

Notes:

1. Includes all silviculture accomplishments funded through the Small Business Forest Enterprise Account. Includes silviculture activities on areas denuded under the Small Business Forest Enterprise Program after January 1, 1988. Silviculture activities are carried out under the supervision of the ministry.
2. Includes spacing of young conifers and the falling of diseased and damaged trees.
3. Includes pruning, controlling of mistletoe, and falling snags and residual trees.

Table M-5: Audit report on Small Business Forest Enterprise Program's basic silviculture performance on Crown land in 1989-90, by region

Region	Number of licences	Total area audited	Basic silviculture in progress		Area declared free-growing			Penalties	
			Free-growing likely	Not free-growing likely	Accepted	Per cent of target	Not accepted	Financial	Allowable annual cut
		hectares				%	ha	$	m^3
Cariboo[1]	-	-	-	-	-	-	-	-	-
Kamloops	12	291	291	-	-	-	-	-	-
Nelson	26	649	649	-	-	-	-	-	-
Prince George	10	576	576	-	-	-	-	-	-
Prince Rupert	11	356	329	27	-	-	-	-	-
Vancouver	13	240	240	-	-	-	-	-	-
Province[2]	72	2 111	2 084	27	-	-	-	-	-

Note:

1. Cariboo forest region did not conduct any audits.
2. Columns may not add due to rounding.

Table N-2: Silviculture accomplishments on Crown land funded by South Moresby Forest Replacement Account[1], by region

Silviculture activity	Cariboo	Kamloops	Nelson	Prince George	Prince Rupert	Vancouver	Totals
	hectares						
Surveying	-	-	-	-	-	1 602	1 602
Preparing sites	-	-	-	-	-	-	-
Planting	-	-	-	-	-	-	-
Brushing	-	-	-	-	-	-	-
Freeing older conifers from competition	-	-	-	-	-	-	-
Spacing[2]	-	-	-	-	-	1 710	1 710
Other[3]	-	-	-	-	-	-	-
Totals	-	-	-	-	-	3 312	3 312
	'000						
Seedlings planted	-	-	-	-	-	-	-

Notes:

1. Includes funding under the South Moresby Forest Replacement Account.
2. Includes spacing of young conifers and the falling of diseased and damaged trees.
3. Includes pruning, controlling mistletoe and falling snags as well as residual trees.

Table O-2: Silviculture accomplishments on Crown land funded by the private sector[1], by region

Silviculture activity	Cariboo	Kamloops	Nelson	Prince George	Prince Rupert	Vancouver	Totals
	hectares						
Surveying	9 498	1 990	2 083	7 211	1 261	3 050	25 093
Preparing sites	15 487	14 011	10 572	32 576	10 963	2 187	85 796
Planting	3 743	3 422	2 755	16 773	6 711	10 929	44 333
Brushing	6 793	1 972	100	793	31	583	10 272
Spacing[2]	167	1	-	-	-	268	436
Fertilizing	-	-	-	-	-	646	646
Other[3]	-	-	-	-	-	20	20
Totals	35 688	21 396	15 510	57 353	18 966	17 683	166 596
	'000						
Seedlings planted	5,406	4,481	3,688	20,057	8,153	8,667	50,452

Notes:

1. Includes all silviculture accomplishments funded through the private sector for basic silviculture.
   Includes silviculture activities on areas denuded by licensees after October 1, 1987, and on royalty-bearing lands.
   Silviculture activities are carried out under the supervision of major licensees.
   The Major Licence Silviculture Information System is the main source of information for this table.
2. Includes spacing of young conifers and the falling of diseased and damaged trees.
3. Includes pruning, controlling of mistletoe, and falling snags and residual trees.

Table O-3: Audit report on basic silviculture performance on Crown land, in 1989-90, by region.

	Number of licences	Basic silviculture in progress: Total area audited	Basic silviculture in progress: Free-growing likely	Basic silviculture in progress: Not free-growing not likely	Area declared free-growing: Accepted	Area declared free-growing: Not Accepted	Penalties: Financial.	Allowable annual cut
		hectares			% of target	ha	$	m3
Cariboo[1]								
Kamloops								
• Ainsworth Lumber Co. Ltd.	1	50	50	-	-	-	-	-
• Crown Forest Industries Ltd.	1	18	18	-	-	-	-	-
• Small Business Forest Enterprise Program	12	291	291	-	-	-	-	-
• Weyerhaeuser Canada	2	66	66	-	-	-	-	-
Sub-totals	16	425	425	-	-	-	-	-
Nelson								
• Crestbrook Forest Industries Ltd.	1	91	91	-	-	-	-	-
• Evans Products Company Ltd.	2	753	622	131	-	-	-	-
• Koolesneoff	1	83	83	-	-	-	-	-
• Pope and Talbot Ltd.	2	280	280	-	-	-	-	-
• Radium Forest Products	1	105	105	-	-	-	-	-
• Westar Timber Ltd.	1	371	371	-	-	-	-	-
• Weyco	1	209	209	-	-	-	-	-
Sub-totals	9	1 892	1 761	131	-	-	-	-

(Table O-3 continued on page 108)

Table O-2: Silviculture accomplishments on Crown land funded by the private sector[1], by region

Silviculture activity	Cariboo	Kamloops	Nelson	Prince George	Prince Rupert	Vancouver	Totals
	hectares						
Surveying	9 498	1 990	2 083	7 211	1 261	3 050	25 093
Preparing sites	15 487	14 011	10 572	32 576	10 963	2 187	85 796
Planting	3 743	3 422	2 755	16 773	6 711	10 929	44 333
Brushing	6 793	1 972	100	793	31	583	10 272
Spacing[2]	167	1	-	-	-	268	436
Fertilizing	-	-	-	-	-	646	646
Other[3]	-	-	-	-	-	20	20
Totals	35 688	21 396	15 510	57 353	18 966	17 683	166 596
	'000						
Seedlings planted	5,406	4,481	3,688	20,057	8,153	8,667	50,452

Notes:

1. Includes all silviculture accomplishments funded through the private sector for basic silviculture.
   Includes silviculture activities on areas denuded by licensees after October 1, 1987, and on royalty-bearing lands.
   Silviculture activities are carried out under the supervision of major licensees.
   The Major Licence Silviculture Information System is the main source of information for this table.
2. Includes spacing of young conifers and the falling of diseased and damaged trees.
3. Includes pruning, controlling of mistletoe, and falling snags and residual trees.

Table O-3: Audit report on basic silviculture performance on Crown land, in 1989-90, by region.

	Basic silviculture in progress				Area declared free-growing		Penalties	
	Number of licences	Total area audited	Free-growing likely	Not free-growing not likely	Accepted	Not Accepted	Financial.	Allowable annual cut
		hectares			% of target	ha	$	m3
Cariboo[1]								
Kamloops								
• Ainsworth Lumber Co. Ltd.	1	50	50	-	-	-	-	-
• Crown Forest Industries Ltd.	1	18	18	-	-	-	-	-
• Small Business Forest Enterprise Program	12	291	291	-	-	-	-	-
• Weyerhaeuser Canada	2	66	66	-	-	-	-	-
Sub-totals	16	425	425	-	-	-	-	-
Nelson								
• Crestbrook Forest Industries Ltd.	1	91	91	-	-	-	-	-
• Evans Products Company Ltd.	2	753	622	131	-	-	-	-
• Koolesneoff	1	83	83	-	-	-	-	-
• Pope and Talbot Ltd.	2	280	280	-	-	-	-	-
• Radium Forest Products	1	105	105	-	-	-	-	-
• Westar Timber Ltd.	1	371	371	-	-	-	-	-
• Weyco	1	209	209	-	-	-	-	-
Sub-totals	9	1 892	1 761	131	-	-	-	-

(Table O-3 continued on page 108)

	Number of licences	Basic silviculture in progress: Total area audited	Basic silviculture in progress: Free-growing likely	Basic silviculture in progress: Not free-growing not likely	Area declared free-growing: Accepted	Area declared free-growing: Not Accepted	Penalties: Financial	Allowable annual cut
		hectares			% of target	ha	$	m3
Prince George								
• Canadian Forest Products Ltd.	8	1 688	1 679	9	-	-	-	-
• Carrier	1	255	255	-	-	-	-	-
• Clear Lake	1	226	226	-	-	-	-	-
• Dunkley	1	214	214	-	-	-	-	-
• Enso	1	79	77	2	-	-	-	-
• Findlay Forest Products	1	14	13	1	-	-	-	-
• Fletcher Challenge	1	82	78	4	-	-	-	-
• L. and M. Lumber Ltd.	2	71	69	2	-	-	-	-
• Lakeland Mills Ltd.	1	192	192	-	-	-	-	-
• Louisiana Pacific	1	366	282	84	-	-	-	-
• Northwood Pulp and Timber Ltd.	2	836	836	-	-	-	-	-
• Peace Wood Products	1	358	358	-	-	-	-	-
• Prince George Wood	1	88	88	-	-	-	-	-
• Rustad Bros. and Co. Ltd.	1	371	371	-	-	-	-	-
• The Pas	1	484	484	-	-	-	-	-
• Weldwood	1	29	29	-	-	-	-	-
• West Fraser	2	737	737	-	-	-	-	-
• Westar Timber Ltd.	1	88	84	4	-	-	-	-
Sub-totals	28	6 178	6 072	106	-	-	-	-
Prince Rupert								
• Bell Pole Co. Ltd.	1	52	52	-	-	-	-	-
• D. Groot Logging Ltd.	2	180	180	-	-	-	-	-
• FLSM	1	85	85	-	-	-	-	-
• Houston Forest Products Ltd.	2	134	134	-	-	-	-	-
• Moricetown	2	67	67	-	-	-	-	-
• Northwood Pulp and Timber Ltd.	2	160	160	-	-	-	-	-
• Pacific Inland Resources Ltd.	2	227	227	-	-	-	-	-
• Stege Logging	1	92	92	-	-	-	-	-
Sub-totals	13	996	996	-	-	-	-	-

	Number of licences	Basic silviculture in progress: Total area audited	Basic silviculture in progress: Free-growing likely	Basic silviculture in progress: Not free-growing not likely	Area declared free-growing: Accepted	Area declared free-growing: Not Accepted	Penalties: Financial	Allowable annual cut
		hectares			% of target	ha	$	m3
Vancouver								
• Ash River Investments Ltd.	1	34	0	34	-	-	-	-
• Canadian Forest Products	4	198	198	-	-	-	-	-
• Canadian Pacific Forest Products Ltd.	3	337	322	15	-	-	-	-
• Coulson Forest Products Ltd.	1	92	92					
• Crown Forest Industries Ltd.	2	98	76	22	-	-	-	-
• Discovery Hardwoods Ltd.	1	12	12					
• Doman Industries Ltd.	1	141	135	6	-	-	-	-
• D. Horth (Woodlot)	1	7	7	-	-	-	-	-
• Fletcher Challenge Canada Ltd.	7	795	779	16	-	-	-	-
• GPL Treatments Ltd.	1	129	129	-	-	-	-	-
• Greater Vancouver Water District	1	6	6	-	-	-	-	-
• Herman Log Sales Ltd.	1	14	14	-	-	-	-	-
• Husky Forest Products	1	59	59	-	-	-	-	-
• Interfor Ltd.	4	259	259	-	-	-	-	-
• Jackson Brothers Logging Ltd.	1	18	18	-	-	-	-	-
• MacMillan & Bloedel Ltd.	8	837	837	-	-	-	-	-
• Mayo Forest Products Ltd.	1	36	36	-	-	-	-	-
• Mill and Timber Forest Products	1	69	69	-	-	-	-	-
• Naden Harbour Timber Ltd.	1	156	156	-	-	-	-	-
• Pretty's Timber Company Ltd.	1	51	51	-	-	-	-	-
• Richmond Plywood Corporation	1	90	80	-	-	-	-	-
• Sitkana Timber Ltd.	1	63	63	-	-	-	-	-

(Table O-3 continued on page 110)

	Number of licences	Basic silviculture in progress: Total area audited	Basic silviculture in progress: Free-growing likely	Basic silviculture in progress: Not free-growing not likely	Area declared free-growing: Accepted	Area declared free-growing: Not Accepted	Penalties: Financial	Penalties: Allowable annual cut
		hectares				% of target --- ha	--- $ ---	-- m3 ---
• Squamish Mills Ltd., MacMillan Bloedel Ltd. and Interfor	1	21	21	-	-	-	-	-
• Terminal Forest Products Ltd. Interfor	2	36	36	-	-	-	-	
• Weldwood of Canada Ltd.	3	204	204	-	-	-	-	-
• Western Forest Products Ltd.	3	472	472	-	-	-	-	-
• Witherby Tree Farms (Woodlot)	1	4	0	4	-	-	-	-
• W.A. Terwinkle (Woodlot)	1	9	9	-	-	-	-	-
• W.T. Errico (Woodlot)	1	6	0	6	-	-	-	-
Sub-totals	56	4 253	4 140	113	-	-	-	-
Totals	122	13 745	13 395	350	-	-	-	-

Notes:

1. Cariboo forest region did not conduct any licensee audits.

Table P-2: Total silviculture accomplishments on Crown land funded by all sources[3] in 1989-90, by region

Silviculture activity	Cariboo	Kamloops	Nelson	Prince George	Prince Rupert	Vancouver	Totals
	hectares						
Surveying	116 324	120 353	121 346	126 442	76 150	94 994	655 609
Preparing sites	23 653	28 539	16 926	54 485	20 077	4 213	147 893
Planting	16 014	21 265	21 291	57 308	30 544	25 665	172 087
Brushing	9 901	6 180	1 653	19 161	10 187	12 940	60 022
Freeing older conifers from competition	718	282	291	261	219	569	2 340
Spacing[1]	8 228	2 987	2 692	3 541	1 600	10 818	29 867
Fertilizing	1 093	1 170	1 254	2 002	1 539	8 494	15 552
Rehabilitating sites	2 698	2 128	2 149	13 792	2 450	189	23 406
Other[2]	4 378	496	2 348	884	606	752	9 464
Totals[4]	183 007	183 400	169 950	277 876	143 372	158 634	1 116 240
	'000s						
Seedlings planted	22,425	27,231	24,536	76,018	37,815	20,549	208,574

Notes:

1. Includes the spacing of young trees and the falling of diseased and damaged trees.
2. Includes pruning, controlling mistletoe, and falling snags and residual trees.
3. Includes silvilculture accomplishments through all funding sources:
   - Ministry Vote
   - Other sources
   - Canada-British Columbia Forest Resource Development Agreement
   - Forest Stand Management Fund
   - Small Business Forest Enterprise Account
   - Private sector
   - Fire and pest sub-program
   - South Moresby Forest Replacement Account
4. Columns may not add due to rounding.

Table P-3: Site preparation for planting and natural restocking on Crown land in 1989-90, by region[1]

Treatment	Cariboo	Kamloops	Nelson	Prince George	Prince Rupert	Vancouver	Totals
				hectares			
Broadcast burned	5 905	7 822	4 811	14 599	9 787	2 097	45 021
Spot burned	963	3 706	1 297	7 692	1 283	146	15 087
Broadcast mechanical	13 870	13 152	9 841	25 543	8 163	12	70 581
Spot mechanical	521	1 448	658	2 946	430	437	6 440
Broadcast chemical	147	245	-	3 580	226	277	4 475
Spot chemical	656	166	75	125	-	703	1 725
Other treatments[2]	1 591	2 000	244	-	188	541	4 565
Totals[3]	23 653	28 539	16 926	54 485	20 077	4 213	147 894

Notes:

1. Includes accomplishments under all sources of funding.
2. Includes mistletoe control, cabling and knockdown of trees over three metres high.
3. Columns may not add due to rounding.

Table P-4: Area planted in 1989-90, by region and responsibility

	Cariboo	Kamloops	Nelson	Prince George	Prince Rupert	Vancouver	Totals
	hectares						
Crown land							
• Tree farm licence[1]	540	2 077	4 383	3 281	1 852	8 877	21 010
• Timber supply area[2]							
• Licensee[3]	9 636	12 895	6 424	35 288	18 810	13 135	96 188
• Ministry[4]	5 838	6 293	10 484	18 739	9 882	3 653	54 889
Sub-totals	16 014	21 265	21 291	57 308	30 544	25 665	172 087
Private land							
• Tree farm licence[5]	-	-	28	-	-	163	191
• Managed forest land units[6]	-	-	228	-	-	1 672	1 899
• Other[7]	-	-	-	-	-	133	133
Sub-totals	-	-	256	-	-	1 968	2 223
Totals	16 014	21 265	21 546	57 308	30 544	27 633	174 310

Notes:

1. Includes Crown land within tree farm licences.
   On areas harvested after October 1, 1987, planting is paid for by the licensee.
   On areas denuded before October 1, 1987, planting is funded by the ministry.
   Planting is the licensee's responsibility.
2. Includes Crown land within timber supply areas, excluding tree farm licences, woodlot licences, farm leases, federal lands and Indian reserves.
3. Includes Crown land within timber supply areas.
   On areas harvested after October 1, 1987, planting is paid for by the licensee.
   On areas denuded before October 1, 1987, planting is funded by the ministry.
   Planting is the licensee's responsibility.
4. For areas denuded after January 1, 1988, under the Small Business Forest Enterprise Program, planting is funded through the Small Business Forest Enterprise Account.
   For areas denuded before January 1, 1988, planting is funded by the ministry and the Canada-B.C. Forest Resource Development Agreement.
   Planting is the ministry's responsibility.
5. Includes private land within tree farm licences.
6. Includes private land within managed forest land units, but outside tree farm licences.
7. Includes private land outside tree farm licences and managed forest land units.

Table P-5: Trees planted in 1989-90, by region and responsibility

	Cariboo	Kamloops	Nelson	Prince George	Prince Rupert	Vancouver	Totals
	'000s						
Crown land							
• Tree farm licence[1]	779	2,894	5,713	3,938	1,603	6,704	21 632
• Timber supply area[2]							
• Licensee[3]	13,688	15,988	7,017	43,806	22,662	10,395	113,556
• Ministry[4]	7,958	8,349	11,805	28,274	13,550	3,450	73,386
Sub-totals	22,425	27,231	25,535	76,018	37,815	20,549	208,574
Private land							
• Tree farm licence[5]	-	-	39	-	-	204	243
• Managed forest land units[6]	-	-	236	-	-	1,269	1,505
• Other[7]	-	-	-	-	-	101	101
Sub-totals	-	-	275	-	-	1,574	1,849
Totals[8]	22,425	27,231	24,811	76,018	37,815	22,123	210,423

Notes:

1. Includes Crown land within tree farm licences.
   On areas harvested after October 1, 1987, planting is paid for by the licensee.
   On areas denuded before October 1, 1987, planting is funded by the ministry.
   Planting is the licensee's responsibility.
2. Includes Crown land within timber supply areas, excluding tree farm licences, woodlot licences, farm leases, federal lands and Indian reserves.
3. Includes Crown land within timber supply areas.
   On areas harvested after October 1, 1987, planting is paid for by the licensee.
   On areas denuded before October 1, 1987, planting is funded by the ministry.
   Planting is the licensee's responsibility.
4. For areas denuded after January 1, 1988, under the Small Business Forest Enterprise Program, planting is funded through the Small Business Forest Enterprise Account. For areas denuded before January 1, 1988, planting is funded by the ministry and the Canada-B.C. Forest Resource Development Agreement. Planting is the ministry's responsibility.
5. Includes private land within tree farm licences.
6. Includes private land within managed forest land units, but outside tree farm licences.
7. Includes private land outside tree farm licences and managed forest land units.
8. Columns may not add due to rounding.

Table P-6: Trees planted[1] on Crown land in 1989-90, by region and species

Species	Cariboo	Kamloops	Nelson	Prince George	Prince Rupert	Vancouver	Totals
	'000						
Cypress	-	-	-	-	9	211	221
Douglas-fir	2,403	4,598	3,493	1,399	216	7,798	19,907
Fir, alpine	-	-	-	33	946	28	1,007
Fir, amabilis	-	8	-	-	19	1,495	1,521
Fir, grand	-	-	4	-	-	353	357
Hemlock, mountain	-	-	-	-	-	54	54
Hemlock, western	-	-	-	-	1,317	3,008	4,325
Larch, western	-	-	1,360	9	-	7	1,376
Pine, lodgepole	11,340	9,016	6,938	25,562	22,449	183	75,489
Pine, western white	-	-	336	9	-	49	394
Pine, yellow	-	104	-	-	-	56	160
Redcedar, western	-	97	535	-	636	4,236	5,505
Spruce, Engelmann and white	8,682	13,407	11,870	49,007	11,384	1,423	95,773
Spruce, Sitka	-	-	-	-	839	1,646	2,486
Totals[2]	22,425	27,231	24,536	76,018	37,815	20,549	208,574

Note:

1. Includes trees for both basic and intensive planting.
   Includes trees planted through all funding sources (Table P-2).
2. Columns may not add due to rounding.

Table P-7: Brushing[1] on Crown land in 1989-90, by region and species

Treatment	Cariboo	Kamloops	Nelson	Prince George	Prince Rupert	Vancouver	Totals
	hectares						
Manual	7 435	4 341	1 604	1 169	4 145	3 441	22 135
Chemical	2 466	1 839	49	17 992	6 042	9 499	37 887
Totals	9 901	6 180	1 653	19 161	10 187	12 940	60 022

Note:

1. Includes accomplishments under all funding sources (Table P-2).

Table P-8: Average cost[1] of silviculture treatments on Crown land in 1989-90, by region.

Treatment	Cariboo	Kamloops	Nelson	Prince George	Prince Rupert	Vancouver	B.C.
	$/hectares						
Basic silviculture							
• Surveying[2]	$12	$8	$9	$10	$12	$9	10
• Preparing sites	298	288	296	230	228	549	261
• Planting[3]	445	429	529	410	379	439	425
• Brushing: manual	378	415	598	772[6]	469	819	541
• Brushing: chemical[4]	250	381	591	210	284	481	289
Intensive silviculture							
• Surveying[2]	16	8	17	9	16	17	13
• Backlog planting[4]	452	426	477	406	367	601	434
• Spacing[5]	470	672	822	604	754	853	718
• Fertilizing	207	194	183	215	211	176	181
• Rehabilitating sites	248	358	538	263	255	1,047[6]	298
• Freeing older conifers from competition	586	565	629	822	671	612	651
• Other	122	173	570	364	475	443	259

Notes:

1. Based on site operating costs (equipment, transportation and wages for crew and crew boss).
2. Includes surveys for assessing site treatment, plantation survival and stocking.
3. Excludes cost of seedlings.
4. Includes cost of herbicides.
5. Includes the spacing of young trees and the falling of diseased and damaged trees.
6. Due to the small program size, these are not considered operational costs.

Table P-9: Seed additions, withdrawals and inventory in 1989-90, by species[1]

Species	Additions		Withdrawals			Seed ownership inventory		
	Natural collections	Seed orchard collections	Ministry nurseries[2]	Private and licensee nurseries[2]	Other[3]	Ministry	Private	Final Inventory[4]
	kilograms							
Cedar, Western Red	1.7	65.8	4.1	62.6	32.1	348.6	170.7	519.3
Cypress	-	0.4	-	13.1	0.7	11.6	5.6	17.2
Douglas-fir	45.0	262.5	42.2	507.2	176.4	9 672.8	2 452.0	12 124.8
Fir, subalpine	-	-	-	111.6	33.4	734.0	77.9	811.9
Fir, amabilis	-	-	-	618.8	181.4	2 199.8	1 600.7	3 800.5
Fir, grand	-	-	0.7	38.2	7.4	704.9	234.6	939.5
Hemlock, mountain	-	-	0.5	1.2	2.4	111.9	28.5	140.4
Hemlock, western	-	22.3	9.7	46.2	31.1	448.1	256.4	704.5
Larch, western	322.7	-	-	31.4	24.9	433.9	145.5	579.4
Pine, lodgepole	2 088.7	22.6	58.5	711.3	156.7	4 766.0	2 486.5	7 252.5
Pine, ponderosa	199.3	-	6.2	26.8	18.8	690.4	226.4	916.8
Pine, white	0.6	0.6	8.2	32.1	-	97.1	435.4	532.5
Spruce, Engelmann	-	0.8	42.3	262.8	349.3	5 384.4	1 250.5	6 634.9
Spruce, Sitka	-	23.0	0.5	13.3	36.1	654.3	112.2	766.5
Spruce, white	-	-	54.7	262.3	242.4	4 102.8	259.3	4 362.1
Spruce, hybrids[5]	1.7	13.6	92.8	317.8	420.6	5 968.2	1 062.1	7 030.3
Miscellaneous	-	-	-	0.1	0.2	24.3	0.1	24.4
Totals	2 659.7	411.6	320.4	3 056.8	1 713.9	36 353.1	10 804.4	47 157.5

Notes:
1. Excludes approximately 100 kilograms from exotic species.
2. For sowing of seedlings primarily in 1990-91.
3. For direct seeding, export, seed sales, etc.
4. Anticipated final inventory upon completion of the 1990 spring sowing.
5. Includes natural crosses between Sitka, Engelmann, white and black spruce.

Table P-10: Silviculture accomplishments on Crown land funded by other sources[1], by region

Silviculture activity	Cariboo	Kamloops	Nelson	Prince George	Prince Rupert	Vancouver	Totals
	hectares						
Surveying	-	592	-	-	-	-	592
Preparing sites	-	305	98	8	-	12	423
Planting	2	21	2	7	-	1	33
Brushing	13	112	-		12	184	321
Freeing older conifers from competition	-	-	-	-	-	-	-
Spacing[2]	11	600	2	71	-	-	685
Other[3]	-	-	518	-	-	225	743
Totals	26	1 630	620	86	12	422	2 797
	'000						
Seedlings planted	3	23	3	9	-	1	39

Notes:

1. Includes funding under the federal job creation programs, and the Joint Job Creation Program. Silviculture activities are carried out under the supervision of the ministry and licensees.
2. Includes spacing of young conifers and the falling of diseased and damaged trees.
3. Includes pruning, controlling of mistletoe, and falling snags and residual trees.

Table P-11: Silviculture accomplishments on Crown land funded by Ministry Fire and Pests Sub-program,[1] by region

Silviculture activity	Cariboo	Kamloops	Nelson	Prince George	Prince Rupert	Vancouver	Totals
	hectares						
Surveying	254	-	933	-	-	-	1 187
Preparing sites	-	-	-	-	-	-	-
Planting	49	-	-	-	-	-	49
Brushing	-	-	-	-	-	-	-
Freeing older conifers from competition	-	-	-	-	-	-	-
Spacing[2]	-	146	-	-	-	-	146
Other[3]	-	-	-	-	-	-	-
Totals	303	146	933	-	-	-	1 382
	'000						
Seedlings planted	71	-	-	-	-	-	71

Notes:

1. Includes funding under the Fire and Pest Sub-program.
   Silviculture activities are carried out under the supervision of the ministry and licensees.
2. Includes spacing of young conifers and the falling of diseased and damaged trees.
3. Includes pruning, controlling mistletoe and falling snags as well as residual trees.

Table P-12: Changes in British Columbia's Not Satisfactorily Restocked (NSR) crown land in 1989[1]

	Managed forest land					Unmanaged	
	Obligation category					Pre-82	Total
	FRDA	Ministry	SBFEP	Major Licensees	Total	Low Site[2]	
	hectares						
Total NSR at the at the end of 1988/89	553 145	990 347	28 015	95 221	1 666 728	305 423	1 972 151
Additions to NSR in 1989/90 due to:							
Logging, fire, or pests[3]	2 513	6 716	23 139	142 029	174 397	858	175 255
Plantation failures	9 830	13 220	61	n/a	23 111	902	24 013
Natural regeneration failures	10 630	1 190	85	n/a	11 905	17 010	28 915
Total additions to NSR	22 973	21 126	23 285	142 029	209 413	18 770	228 183
Reductions to NSR in 1989/90 due to:							
Planting	31 755	93 020	2 979	44 333	172 087	-	172 087
Natural regeneration	105 236	34 434	509	n/a	140 179	11 720	151 899
Reclassification	2 436	8 841	38	n/a	11 315	2 180	13 495
Total reductions to NSR	139 427	136 295	3 526	44 333	323 581	13 900	337 481
Total NSR at the end of 1989/90	436 691	875 178	47 774	192 917	1 552 560	310 293	1 862 853
Net decrease in not-satisfactorily-restocked-land in 1989/90					114 168		109 298

This information does not include 2.0 million hectares of pre 1982 not-stocked land which is on the Inventory Branch database. The Inventory Branch database is on a two-year update cycle. Much of the 2.0 million hectares is considered inoperable, inaccessible or uneconomic for treatment. Natural restocking is in progress on many of these areas.

Key to obligation category:

FRDA- Canada-B.C. Forest Resource Development Agreement
Good and medium site areas denuded prior to 1982
Ministry Areas denuded by the small business program and licensees.
Areas denuded between 1982 and October 1, 1987.
SBFEP- Small Business Forest Enterprise Program
Area denuded after January 1, 1988.
Major Areas denuded by Major Licensees.
Areas denuded after October 1, 1987.
n/a Information is not available at time of report.

Source of information:

Ministry of forests History Records[1]
Major Licence Silviculture Information System[1]
TFL reports for areas denuded prior to October 1, 1987.

1. Information on these systems is updated every 6 months at a minimum.
2. Poor and low site class forest land denuded prior to 1982 on the history records and on TFL reports.
3. Excludes roads and landings created through harvest.